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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

JAMES W. WHITE, M.D., D.D.S.

Observe, Compare, Reflect, Record.

VOL. XXXII.

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THE

DENTAL COSMOS.

VOL. XXXII. PHILADELPHIA, JANUARY, 1890. NO. 1.

ORIGINAL COMMUNICATIONS.

PROFESSIONAL PATENTS.

BY B. HOLLY SMITH, M.D., D.D.S., BALTIMORE.

(Read before the New York Odontological Society, October 15, 1889.)

MR. PRESIDENT, AND GENTLEMEN OF THE ODONTOLOGICAL SOCIETY :

In preparing this paper upon the subject of patents, I am aware that a great deal of what I offer is not new, but has been often said before, and doubtless better said ; but I am influenced by a desire, not vain or chimerical, I hope, of approaching the subject dispassionately, of securing an amicable compromise which shall be honorable both to those who support and those who are opposed to patents. Above all, I wish to encourage calm discussion and thoughtful consideration of the topic, conscious that bitterness and crimination are both unbrotherly and unwise. It is an easy thing for the upholders of different doctrines to find much to ridicule in that which they attack ; but to recognize what is just, fair, and right in your opponent's argument, to answer in a spirit of candor what you conceive to be the errors of that argument, and above all not to occupy the attitude of infallibility, so overpowering and so exasperating, that is not so easy. Into even these faults I may have fallen, but against these sins I have sincerely and honestly tried to guard ; and if I have failed in anywise in this object, it must be ascribed, not to unwillingness of spirit, but to weakness of flesh.

The arguments of those who uphold and support the professionality of patents in dentistry seem, as far as I can judge from a somewhat careful study, to be confessedly or impliedly founded on one or more of the following reasons :

1. The legality of a patentee's right to the property of his invention, given him and protected by law, and a consequent indignant sense of injustice whenever it has been attempted, in any manner, to question that right.

2. The fact that the right to patent and to reap the rewards of patents has given a stimulus to inventive genius, and has multiplied machines, instruments, and appliances which dentists may use and from which they may choose.

3. As a consequence, the attraction to the patent of capital and business to develop, introduce, and push it, increasing the number of any given appliance and lowering the cost of its manufacture, so as to put it within reach of most dentists.

4. The palliating fact that authors copyright their works.

From 2 and 3 an increase in the effectiveness of the profession's work, it is argued, results, and a corresponding advance in the profession's position and rank. Stated a little more concisely, these reasons would read, if given by a patentee to an opponent, "If you were to stop me from patenting my inventions, you would injure me in a legal right, a property right; you would cut off a stimulus which has produced a larger part of those appliances which enable dentists to work so effectively; and, besides, do not authors copyright their works?" The truth of the first statement admits no denial. It is simply irrefutable. Neither does the fact that there is an occasional unfriendly, not to say unbrotherly, dispute as to who is the lawful owner of this property right, as the original inventor of the object in controversy, render this proposition any more assailable. The law has a machinery, more or less cumbersome and expensive, for deciding between litigants as to their respective rights; and after the decision has been made I am legally bound to respect it, and to observe with accuracy and care the distinction between *meum* and *tuum*. Nor does it make any difference as to the correctness of this proposition that, pending litigation, the troublesome injunction awes a great many brother practitioners and their suppliers into a more or less lengthy disuse of what may have grown a daily necessity, subjecting them, at least temporarily, to discomforts and comparative ineffectiveness, and certainly impairing for the time the effectiveness of the entire profession, in order that a dispute between A and B may be settled as to who conferred the inestimable benefit of this idea on the profession, and as to who is entitled to the profession's gratitude, honor, and a fair proportion of the profession's dollars.

It is no argument against the legality of this property right to note *en passant* that the mercantile nose smelleth the profit afar off, and that back of each disputant, frequently in the place of each, is a company whose unquestionable, frank, and avowed aim is to make money from the invention in a legitimate business way ; and with such companies no fault can be found. They have a legal right to purchase what money will buy, and surely cannot be condemned if they secure a patent, or, for that matter, a patentee, more or less, in their purchases. No ; these accidents and incidents of little personal disputes about property rights and claims to professional honor and distinction, and dollars, the temporary embarrassment of a large part of the profession, and the occasional injection of a little genuine, unalloyed first-hand mercantile haggle, chaffer, and bluff may be distasteful to a few fault-finders, but we must all see that a legal claim to property is back of the whole proceeding and justifies it. It is just a question, aside from the possibilities to which we have just referred, whether a patentee is acting more as a merchant with something to sell or as a professional man with some positive addition to the profession. The motives actuating him are at least capable of debate. And when he insists on his property right all doubt is removed, and he shows up strong in the attitude of the merchant,—an attitude honorable and not to be impeached, but, I take it, not professional.

And here, let it be understood, we raise the point that our dispute is not as to the honor of the transaction in question, abstractly considered, but relative to the place the patentee occupies as a professional man or not. In other words, we raise the distinct claim that a course of conduct perfectly legitimate, honest, and honorable when weighed by ordinary business standards falls below the professional standard. There is certainly a difference, and a wide difference, between the ethics of a business and the ethics of a profession. It grows from the inherent nature, purpose, and aim of the two. The logical, essential, and consistent aim of business is the multiplication of values, the development of markets, the increase of profits. The very nature of exchange, when it rises above the rudimentary barter of savages and becomes an element of a powerful civilization, demands these. The improvements in the state of society arising from the increase and more general accessibleness of creature comforts inseparable from the large and symmetrical development of business are accidents, accompaniments, not essentials and aims. It is not therefore dishonorable, from a business point of view, to take an advantage of a monopoly, to raise prices when a demand increases, or in other words, take an advantage of a man's necessity, to combine when a market is overstocked to limit the production of a necessity of life, as in the various trusts daily formed and forming, nor to cut down wages already below the level of decent living that dividends may not fall off, nor to refuse credit or service to an insolvent. Such things are a business man's opportunities, from the successful observation and use of which his fair fame and fortune grow apace, and cause him to be recognized as a solid man and a financier, an honor and an ornament to the community in which he lives.

Not discrediting the purposes of business, nor the methods which perfect consistency with these purposes allows, the question next arises, Are these the aims of a profession impliedly or avowedly, or are its functions of a higher and a nobler character? Is it the aim of a profession pure and simple that its members acquire wealth, or that they successfully, honorably, and conscientiously enable it to discharge its appointed functions to humanity? Is the principle of barter the elementary, essential, and controlling principle of a profession, or has it a self-appointed duty to perform? Is it professional, is it honorable for those who identify themselves with a profession as members to rigorously insist on a pecuniary equivalent for such additions to the profession's knowledge and effectiveness as he may have the good fortune to make? Is it not rather his professional duty to make those additions uninfluenced by any consideration beyond, or I should say below, the profession's advancement and enlarged power to work?

This seems to me the distinguishing characteristic of a profession, that the amelioration of mankind's condition in some respect is its specific aim, and the enriching of individual members an accident; whereas in that which we term business the multiplication of values and the increase of profits is the controlling principle, and the improvement of social condition the incident. It is therefore not consistent with the ethics of a profession when a given course of conduct is called into question, to justify oneself by reference to business standards. We surely know it is not professional for a physician, for instance, to refuse to relieve suffering, though the sufferer should be unable to pay for the services rendered, or to take advantage of the extremity of his patient by charging an exorbitant fee, or to suffer the character of his services to deteriorate from a consideration of a probably scanty remuneration. Any one of these things would be justifiable from a business point of view, but none from a professional. And such conceptions of what is and what is not professional, well settled and accurate enough, are but the logical outcome of the accepted idea of the character of professional work, the claims which humanity has on one because of his membership of a profession whose aim avowed and expressed in thousands of eloquent and ennobling testimonials, through offerings of philanthropists and sufferings of martyrs, is to alleviate pain, to diminish sickness, to promote health, and increase the happiness of mankind. These are not such things as require a delicate test of the conscience, but a simple reference to the professional code, that code the inevitable outgrowth of the purpose for which the profession was formed and the demand that called it into existence.

Now if we have established, as we have tried, that the law controlling the exchange of values is not the one governing the discharge of a profession's functions, that a man may be under a pressing professional obligation and feel no whit the friction of a legal stricture, if he is professionally bound to give something, even though he does not receive a *quid pro quo*, it would certainly seem that property rights are not always identical with professional rights, that for a sufficient reason the former must yield to the latter, and that it is no answer when I say to a brother dentist, "It is unprofessional in you to patent your invention," for him to reply, "My invention cost me time, labor, and money. It is, moreover, a property right which the law expressly recognizes and protects. It is therefore not unprofessional for me to patent my invention." Such a retort does not refute the charge, and absolutely refuses to recognize the essential distinction between a profession and a trade, or to see any difference; and with those who thus respond it is useless to argue, as, having no common premise in a commonly accepted idea of the terms in the controversy, you can deduce no consistent conclusion; it is simply a case of irreconcilable difference in view, with no hope of an agreement or compromise.

The second argument of those who support the professionality of patents is, that the power to patent and the money derived therefrom is the stimulus which has multiplied inventions and thereby increased the effectiveness of dentistry in enlarging its capacity to deal with the ever-varying problems of disease and its cure.

This argument, in that it has at its basis the advancement of our profession on its mechanical side, cannot be dismissed as irrelevant, but must be met seriously and carefully. In the first place the animus, in the next the result. So favorable a result would excuse, even to a man sensitively professional, much that is repugnant to him in the means by which it is produced. It is *per se* a benefit, and of such importance that many discomforts should be undergone that it may be realized. Especially is this true if this is the only means, or the best means, to attain so desirable an end. Stated fairly, this proposition is that the money rewards of the patent system furnish the only or the best stimulus to professional inventive activity. When you reflect upon it, that is a grave statement; it is more: it is a charge, an accusation. True, it is supported by such brilliant and accepted proverbs as "From the stomach comes the dance;" "Money makes the mare go;" "The jingle of the guinea helps the hurt that honor feels;" and others, at once forming a body of economic wisdom and containing a lamentable satire on the avarice and cupidity of man. But it is none the less a grave charge if true and demonstrable. Are we not in a somewhat pitiable plight, and rather put to it to be considered a profession at all, if this is the real state of affairs, and we recognize alone so low an appeal as the one which stirs inventive talent and evolves those instrumental wonders which make dentistry the able auxiliary of medicine?

It is of course easily perceived that it is not claimed for the stimulus relied on that it is the best for the reason that it appeals to the best impulses, but because the material results are vaster; it is held by our friends to produce more instruments and appliances than any other stimulus. Is this true? And if it is true, is it true of the profession of dentistry alone? It is demonstrably untrue of medicine. Witness a long list of things made and formed under a nobler and higher stimulus. Are these less effective or less wonderful because not produced by cupidity? Or to put it more mildly, even though their inventor gave to his profession what he could ill afford to present, and they received that for which they could well afford to pay, is it not at least a pardonable weakness to believe that in some of these cases the profession forbore to wound the pride of the inventor by placing on his offering to science and to them a monetary and purchasable estimate?

Our practical and business-like friends will forgive us the thought and the wish that such things might be, and a fraternity of fellowship and a community of noble thoughts from which great ideas spring and to which their zealously guarded property rights are unknown. While we think it not difficult of proof, if indeed it be not conceded, that humanity may have a claim on one not to be measured by a business standard of *quid pro quo*, on account of his membership of a given profession, yet is it true that the brother member of that profession has no claim? and if he has, what is it? An empty courtesy, a grudging acknowledgment, a surly companionship, a suspicious observance, and a jealous watchfulness lest property rights be violated,—are these the generous marks of fraternal, helpful, professional fellowship? And then what supreme egotism in the ever-reappearing and dominant idea of a patentee that his brethren are either a band of whining mendicants or a horde of unprincipled brigands, attempting to cajole or threaten him into the delivery of that which may be sold for much gold! Do you suppose it ever occurred to such a one to estimate by his own scale what he had received from his profession, and to contrast with that what his invention to the profession would amount to, and on which side the balance would stand? Really, are we not debtors to generations whose unselfish achievements have made our works possible? And is the debt less sacred or the obligation less binding because naught more imperative than a sense of honor impels the discharge of the one and the fulfillment of the other? What our predecessors, the establishers of our rank and position, have done, it is their demand upon us that we should do; that is, add our little contribution to the sum whose aggregate forms the body of professional lore and professional wisdom, and not carp about recompense.

If the question should be asked any one of us, "What do you owe to your profession?" could he answer less than this: "Competence, independence, a place in society the more honorable in that it makes me useful and gives me more than ordinary opportunities for doing good; a mind broadened, refined, and cultivated by a study of the scientific principles upon which that profession is founded, and whose symmetrical and complete development is that profession's fullness; a moral sense softened and humanized by a conception of duty, the nobler because I am a member of that profession." And in reply to the query, "What may you justly demand of your profession?" can he not say, "Competence, independence, a place in society the more honorable in that it enlarges my chances of doing good; increase in capacity and opportunity for making greater my profession's usefulness and effectiveness." You cannot ask more, and you would be ashamed to ask less. One more question: What can your profession demand of you? The earnest employment of your every energy that its knowledge be broadened, that its practice be improved, that its weaker members be strengthened, that its range and degree of usefulness and force be widened and raised. This is a matter of duty, and do we not feel it with sufficient intensity to make it a stimulus, not only loftier, but more powerful than that of cupidity? What we need is thoughtful consideration of this matter, and an absence of lightness and frivolity in its treatment. Ridicule, sneers, and undervaluation should avail naught in the sober contemplation of this subject by especially our younger members, and it is perhaps the most unfortunate aspect of the whole question that when one advances such ideas as the above he should feel himself called on to say, "I am not mad, but speak forth the words of truth and soberness."

When it is considered that a clear recognition and a simple acceptance of the duty an individual owes his profession would do so much to settle any and all agitation as to this subject, it cannot but seem both strange and sad that that duty should so long remain an unknown and a disputed quantity. I have read arguments tending to show that the writers of them thought that the outlay of time and money spent in securing the D.D.S. is an ample recompense for the privilege conferred of introduction into the profession of dentistry, and who regard the payment of tuition fees as a full and complete discharge of all obligations, and the title as a kind of password of a free lance at full liberty to prey at once on mankind and professional brethren, as need and opportunity should occur. These are, happily, mere instances, and are only referred to as abnormal specimens of moral perverseness.

It really appears, then, to us that the truly professional stimulus of duty and honorable ambition should be more powerful to produce improvements and benefits than the monetary stimulus of possible profit. Should that point be open to successful argument, as we fondly hope it is not, there remains the fact that the very reason which is most relied on as a foundation for this patent system is probably the strongest for its rejection. If it be true that the members of our profession respond alone to business and commercial instincts, and recognize alone the money-getting impulse as their secret spring of action, it were well, if we cannot supply them with a nobler, at least to deprive them of the baser. Under the influence of an idea as dominant as the advocates of the patent system represent this to be, I cannot see that there is any perceptible distinction between profession and trade. The adoption of these methods and the recognition of these principles as cardinal certainly goes to the base of any distinction that may have existed and utterly effaces it. And I am at a loss to perceive the consistency of our brethren who incorporate purely business principles and business stimuli into their professional code and ambition, and then clamor for recognition as a profession. In such cases it is really

"Strange such difference should be
'Twixt tweedledum and tweedledee."

The trade is good enough for you; you want to carry the trade with you; why not stay in the trade? Any attempt by verbal jugglery to confound the distinctions that are so clearly implied in the separation between a trade and a profession should be instantly met and pinned down. They do not exist in the character or severity of the scientific training imposed upon the would-be members, for it is easily demonstrable that many trades require training just as scientific and more extended and severe.

They do not depend on the inherited or acquired mental, moral, or physical caliber, habits, or tendencies of the membership. These will be found as various and diverse in the one as in the other, and the average man in the one will not fall so far below the average man in the other. The simple and plain line of distinction between the two is the difference of the cardinal aims they propose. That of a trade is intrinsically selfish; that of a profession intrinsically unselfish and humanizing. When this is perceived and our course of action in this, as in other matters, referred to elementary principles, there can be no cloudiness or confusion of ideas; and as soon as the reason of this distinction is discarded, and one begins to strike a balance between advantages and disadvantages, there exists no longer any fundamental distinction between a trade and a profession. The pro-patent advocates advance as a part of the same argument setting up the mercantile stimulus as the only worthy and powerful promoter of inventive activity, another claim that demands our consideration. This is, that a good patent attracts capital, makes the manufacture of a large number of the instrument or machine possible, and thus puts a valuable auxiliary within the reach at least of the greater part of the profession. We believe this is fairly stated, and we believe, moreover, that it is true. We cannot complain that business men should employ their money and their enterprise where there is a fair chance of a profitable return, and still less when as the result the efficiency of the profession is increased. In fact, we have no quarrel with business men in their fair and legitimate use of business methods, but we naturally desire that such methods be left to business men and not introduced into the profession. And right here is one of the discomforts. If there is one point upon which scientific and professional men are sensitive, it is that they be not deceived in their researches and experiments, their operations and clinics, by those who, while professedly teaching, are in reality advertising.

It would probably be an interesting problem to trace the cause of this sensitiveness, but there it is. Interest is apt to go when it is seen that disinterestedness is not present, and information and knowledge are often unjustly discredited as a desire to advertise. Why is it, gentlemen, you do not breathe the air of the shop with comfort? It is perfectly respectable to advertise ; it denotes business acumen to do it well. And then think of the advantages to business and professional men of using a clinic as an advertisement for a good patent by a skilled operator. Where else could we have such a concentration of skilled and intelligent criticism on the one hand, or where so fine an opportunity to introduce our wares on the other as at, for instance, this dental association? And yet you grow restive. You astonish me. This is no unwarrantable act of interference on the part of the people pushing this thing. Is not your professional brother the inventor and patentee, and has he not a brother's right to be heard, to instruct, to teach? And has he not in the assistance of capital the very best agent for his purpose of placing this valuable invention where it will benefit you all, at the lowest possible figure, after reserving a fair profit? It certainly seems a clear case of common interest. You are interested as a man in bettering your working power, and as a dentist in improving that of the profession at large. The clinician and exhibitor is interested in the commendable intellectual pride of conquest, and also in the possible commercial recompense he will get ; the capitalist is interested in selling the machines. And yet, somehow, you do not seem to enjoy it. You must get over this squeamishness, and not retard the wheels of progress by foolish sentiment and undue and indefensible sensitiveness. That will never do.

Is it possible that the indefinable sense that this, as many other accompaniments of the patent system, is not professional influences you? If this be true, will you analyze your feeling, trace it back to primary causes, and try to discover that the very source of your discomfort is at the base of the whole system? It may be said, and justly, this is not an answer to the argument, but rather the recognition of an instinct. I confess that patents do attract money, and that their multiplication and accessibleness depend on a wise and liberal use of capital. But have we given the non-patent a fair showing? Has it not been handicapped from the start by the fact that our recognition of patenting and our brothers' persistence in patenting have rendered the position of capital and enterprise perfectly natural under the circumstances? The contests over priority and the endeavors to control markets and limit outputs are the legitimate consequences of this state of affairs. Gifts of inventions to the profession, it is true, may not now be as profitably, and consequently as well, as extensively, and as cheaply manufactured as patents over which the manufacturer has complete control, but will this be so severe a loss to us? We think that a healthy demand for what is good will supply with an equally beneficial result the place of the artificial one often created by manufacturers for purposes that are obviously not the incidental benefit derived by the profession, but rather the direct profits reaped by the companies. This is at least worth a trial, and if the good of the profession is the only reason that dictates this last argument, if there is no selfish taint in the reasoning, it is hardly just to say that something not fairly tried will surely fail.

This, at least, seems called for, that there be a separation between the patentee and professional man, and that they no longer discharge their inconsistent functions together. If submission to patents is a necessary evil, it is not necessary that professional hands should inflict the evil; if the shadow of reproach attaches in any way to the professional patentee, it is easy for him to divorce the incongruous positions, and betake himself with credit and honor to the profession, or with equal credit and honor to business. If, as we have attempted to show, concerning the actions which are the natural sequence of patenting an invention, the ethical considerations are entirely different, as one occupies the position either of a professional or a business man, and since it does not seem possible to reconcile these inharmonious elements, why not occupy either the one attitude or the other, and have the comfort of being consistent? One fear that seems to have prevented this separation for a long time is that the profits arising from patents will be obtained by outsiders dishonest enough to appropriate the ideas of other people, and to endeavor to obtain a monopoly of the rewards arising from the advantage of their application. This danger is easily guarded against. These practical instincts of interlopers can be frustrated and rendered of no effect. Besides, it were better that a few should enjoy such ill-gotten profits than that the system should be left among us to rankle and fester within, and to be reproachfully pointed to from without. It may at least, then, be contended that while a patent does attract capital to the invention, and thus multiplies and cheapens it, that this end could presumably be as well attained by more professional means ; that be it true or not that it could, it is at least open to serious question whether the ends justify the means.

A common and oft-repeated defense of patentees in dentistry is that medical men are doing the same thing. There can be no doubt that the vast body of the medical profession look on with evident surprise that this question should be so long unsettled among us. Despite the fact that there are patent medicines, many of which have been enumerated by late writers on this subject, there yet remains the incontrovertible fact that the attitude of medicine is inflexibly opposed to this thing, and that subterfuges and disguises have to be resorted to that anyone who desires to be considered a reputable physician may obtain the profits of his patent. The acts of those who resort to such expedients cannot be quoted as any approval of the medical profession ; on the contrary, they bear on their face the evidence of its severe disapproval ; they must be done in the corner and secretly to avoid open condemnation. The fact that eminent operators have made use of their inventions with brilliant results not attainable without them has been quoted by eminent men of our profession as irrefutable proof that medical men do not condemn the patent system. We cannot, with all due deference, see the coherence or logic of this argument. Such use, gratifying as it must be to the inventor, and honoring him as one professional man's supremest tribute to another, beyond the recognition of the scientific value of the instrument, in no wise approves or condemns the sale of the idea which the instrument materialized. It is perfectly silent as to all expressions of approval or disapproval of the ethical aspect of that action ; and rightly so, as such expressions were neither asked for nor required. Another defense equally as equivocal is the one that copyright is just as indefensible as patents, and for the same reasons.

It will frequently be said to an opponent of the patent system, There is no reason you have urged against patents that cannot be used with equal force against copyright. The implication is, since you support copyrights, you cannot consistently oppose patents, and the attack is against the implied inconsistency of the debater, not upon the strength of the arguments. We have to remind our friends that even if what they say be conceded, it is not the copyright which is being defended, but the patent which is being attacked. I can see that a great many of the arguments against patents have also force against certain classes of copyrights, but it does not appear to me that they are any the less forcible on that account. But I can see also that the direct aim of a copyright cannot be exactly the same, nor the result so injurious, as those of a patent. No copyright can be intended to secure the monopoly and sole advantage of an idea, because such a result is an impossibility from the nature of language. It is the language, arrangement, and method, not the knowledge and ideas, that are copyrighted, and so variable and capacious an instrument is language that this knowledge and these ideas may be reproduced in many different forms, and the good results that arise from their introduction and dissemination are thus in no way impeded. Nor can there be conflicting claims to be fought out in a court-room as to whose the idea really is. The material forms will be different, and the courts will not endeavor in such a case to settle the question of original authorship. The benefits and advantages of the research will not therefore be hindered by a squabble for precedence and profit. Such disputes are among the most melancholy of spectacles, there remaining not even the palliating fact that they are for honor, but solely for gain.

It is gratifying to notice that the ultra position of our advocates of the patent system is gradually shifting and showing the moral effects of argument and opinion; many of them, I find, while they uphold the patenting of instruments or of any material invention, yet condemn the patenting of methods and ideas. This is a great concession by them and a great advance for us. It concedes the principle for which we have contended, and it will not be long before it will be clearly seen that the patenting of an instrument is like the patenting of an idea, though that idea be in material form. There is no hope dearer to my heart than that the extremists of both sides of this question may, by their concessions and friendly advances, find a common ground of compromise and agreement in this controversy, alike honorable to them and creditable to dentistry.

A united profession is what we want and must have: an unbroken front, a harmonious brotherhood. With such our course of usefulness and honor is but beginning, our activities but just awakened.

That such a consummation may be effected is our most earnest wish, and we say with Burns,—

"Then let us pray that come it may,
As come it will for a' that,
That man to man the world o'er
May brithers be for a' that."

CORRESPONDENCE.

"THE NECESSITY FOR INDEPENDENT DENTAL JOURNALISM."

To the Editor of the Dental Cosmos :

There appeared among the proceedings of the American Dental Association for 1889, published in the November number, 1889, of the Dental Cosmos, page 861 *et seq.*, an address upon the general topic, that dental journalism should be placed in a condition of freedom from the interests of dental trade and of personal influences. This was maintained upon three general grounds : That the trade houses in their publications have failed to exercise the proper moral and intellectual influence upon dentistry ; that their standard of business morals has disqualified them for this work ; and that the self-respect of the dental profession requires that its chosen representatives should have charge of this important work.

The address, while written in some haste, contains the deliberate opinions of the writer, which are based upon the observation of the manner in which trade journalism was commenced, the private purposes for which it has been carried on, the general silence upon questions needing solution, and the weakness exhibited when opinion has been required. Eventually the abuses of trade by the leading dealers as exhibited by their efforts to prevent competition and freer trade have shown such a degree of obliquity as to demonstrate that while they have jealously cared for their own interests they have become the enemies of dentistry, and as such are no longer to be trusted as leaders of opinion. This culmination required the silence to be broken.

The editor of the Dental Cosmos, who has shown discourteous spirit of late when anything concerning the public policy of dentistry has been under discussion, has made in the same number of the Cosmos in which the above-mentioned address appeared a criticism of it, which, taken altogether, emphasizes very strongly that the conclusions of the address have not fallen short of the mark, and that dentistry has not sought too soon to place its journalism on a different footing.

This criticism, but for some apparently purposed misquotations and perversions of statement, might be safely allowed to rest without reply.

The misquotation occurs on page 906, when the words, "of the sensitiveness of trade," are left out. The perversion of meaning consists in endeavoring to make it appear that the writer considers business men generally to be dishonorable and over-riding, whereas it was stated in the address "that those whose standards of business were low are morally unfit to lead the opinions of others;'' showing that the writer does not regard business men generally as having a low standard. Upon these two perversions were built an unfair criticism totally unbefitting the matter and unworthy the DENTAL COSMOS. The subject of the paper certainly is a proper one for discussion by members of the dental profession, unless the COSMOS thinks that its ownership also includes that profession.

It would have been more accordant with the occasion had the critic employed logic instead of resorting to perversion, sarcasm, and ridicule, —a means of treating a serious subject which usually is understood as betraying weakness of the position of anyone attempting to reach his opponent in this manner.

The editor of the COSMOS arraigns the writer for views which are probably held by all dentists who have the honor of their profession truly at heart. This is not a new movement. It has been long growing, and has had its activity intensified by the plainest disregard on the part of certain houses of that golden rule to which the editor of the COSMOS has more than once alluded. The sense of justice and the love of the public good have been violated. Dentists have, like patient beasts of burden, at length found it necessary to use their heels, and they mean to batter at these evils until they cease to exist. There is enough evidence not only to prove all the allegations contained in the address before the American Dental Association, but more than is required to bring "a plague upon their houses."

As the pages of the COSMOS have been offered me to make explanations, I accept the offer, but cannot indulge the editor in making the personal charges and incriminations to which he invites me. These I believe are not required. The intelligent reader who has sufficient knowledge of what has taken place in dental matters during the past generation understands well what is meant. This is a conflict involving principles, and neither sarcasm, ridicule, nor perversion can induce me to descend to personal controversy with the editor of the DENTAL COSMOS.

The consideration of public abuses is not usually approached by arraigning individuals. Their nature is pointed out and their tendency outlined for the purpose of developing opinion which at length becomes the power to correct the evil.

At the outset of the criticism of the editor the attempt is made to turn the language of the writer back upon him and make him his own accuser. This is done by an endeavor to show him to be a party in interest, because at the same time he happens to be president of the International Dental Publication Company. The fact is, that whatever "bias" existed in the writer's mind arose from a deeply-rooted sentiment of regard for the good of his profession, which had become forged into the most decided views upon the subject of dental journalism in favor of its freedom from baneful trade influences. He was selected for the place he occupies for the principal reason that the cause of free dental journalism had been his fixed sentiment for many years, and whatever "bias" he has may be considered a correct and loyal one, and has served to give force to these convictions. He stands at present as the representative of views which are maintained by a very long list of leading practitioners. These have observed the defects of trade journalism. These have felt the deficiencies of that method. These have suffered the effects of silence and the weaker-than-water counsel when clear, forcible, and true opinions were needed. These have tried in the balance dental journalism as it has been conducted, and have found it wanting. These have demanded that better than the best we have had is needed. These have observed also certain growing abuses upon the part of those engaged in trade interests and have revolted against them. They have entered into the work of independent journalism, not as a paying business enterprise, but as representatives of their profession, to do for it what they can to remove the influence of trade interests over journalism and look to the future to develop a work of value to the advanced worker and an inspiration to the novice.

This movement being one springing from an impulse which primarily regards the public good, cannot by any ingenuity be made to appear to have any of the qualifying motives that inhere in the present trade efforts in this direction. The attempt to weaken the influence of such a sentiment because its exponents have taken the natural means to ultimate their efforts, and the endeavor to lower them to the level of those who publish similar journals for their business purposes, is as absurd as it is preposterous. It is an artifice like that of a culprit who when brought to justice endeavors to escape merited punishment by assailing the character of the prosecutor. We may pertinently ask, Where could be found anyone to take up this cause who would not be chargeable with the same interest? Every intelligent dentist of America who has not in some form drank of the letheon or partaken of the pottage of the editor making the above-stated criticism has the same views and desires the success of the new movement.

The editor takes great exception to the language "that the general tendency of trade is to secure the good of the individual to the disadvantage or the injury of others." If this simply were the opinion of the writer of the address, it might, in view of the fact that the average general tradesman is honorably disposed, lay him open to censure. But notwithstanding the honesty of the mass of men this, in the opinion of public writers upon the course of business affairs in the past twenty years, "is the general tendency of trade." It is constantly being deplored by writers upon the economy of business, that the rules and conduct of business houses are pressing with greater and greater rigor upon the smaller establishments and against those of special production. Business affairs have become more feverish because there is less of fairness and of truth, and all are feeling the grasping influences of those who do not hesitate to take any advantage, however unfair, to injure, undermine, or destroy any important competing industry not strong enough to withstand their opposition.

It may be stated here in explanation that business has three relations:

1. To the individual customer, in the treatment of whom, for the plainest reasons, all have to be fair.

2. To the competitive dealer, where the temptation to be insincere is most intense.

3. To the public good, wherein infraction of the natural rights of the competitor works an ultimate injury to the body politic. It is with these two latter relations that ethics usually has its application.

Dental trade, unfortunately for the honor of human nature, has not been free from intrigues. Some of these have been ungrateful and outrageous. The game has been cleaned to the bone, and the foxes have gotten away apparently unseen.

The attempt to prevent competition by questionable practices has not been successful. Each competitor or special producer killed off sowed dragons' teeth and other dealers grew up apace. At length the stronger houses, finding they could not destroy each other, have joined hands and forced others to join with them to do violence to the public good, by combining to restrict trade. Not content to let each other live, not content to employ the legitimate qualities of honorable business,—enterprise, industry, courtesy, and fidelity in relation to the production and dispensation of wares of the highest excellence,—they have adopted methods which have the objectionable features of what is termed "boycotting." Concerning these practices, which are manifestly contrary to the common law in force in most of the States, we have evidence sufficient in our possession to create a sentiment, if it were made public, that would produce a revulsion against the purposes of the Trade Association, which is doing unblushingly and somewhat openly what any one of them before would only have done by flank movements.

Dental trade resorts to these acts for the reason that the aggregate of customers is not large, and fearing to rely upon the ultimate results of depending upon the application of the "golden rule," they apply the barbarous maxim that business is war, and therefore look upon each new competitor as an enemy whom in their fear they soon convert into a worse sort of creature, and then is said, "We must fight the devil with fire."

The restrictive plan of business is an injury to the dealer class, because it restrains freedom of trade and prevents the survival of the fittest. Any method of conducting business which causes these effects is also an injury to the public. Whenever this is carried out by the conspiring of several persons to effect it, the common law takes cognizance of the injury and an indictment is liable to ensue. The tendency then is to the survival of the strongest, which is less for the public good than the survival of the fittest. As the general good is what the law is most zealous of, therefore it is most stringent in its application to those forms of conspiracy to impair the public right of freedom of trade, to which the possession of business power is generally opposed.

These dealers would inform us we should let them alone,—this being always the cry of those in the wrong,—that we should attend to the discussion of "methods," and would gag discussion upon a subject which has become of paramount interest to everyone practicing dentistry.

The editor of the COSMOS seems much perturbed over the use of the word "usurped," and failing to see its broader meaning to be, to assume to do that which belongs to another to do, asks "whether the dentists of the world have been compelled to submit to an arbitrary assumption of power," etc. We desire now to answer his question by questioning him: Who authorized the editor of the COSMOS to prescribe for the dental profession the kind of subject they should discuss at their meetings, or apply the lash of sarcasm when the discussed subject appeared inimical to trade interests? Is not the assumption of authority exhibited in his editorial criticism of a paper forming a part of the proceedings of the American Association a dictation bordering on actual usurpation?

Dentistry desires in its higher appreciation of the golden maxim of doing to others what one would have done to himself that those desiring to trade in dental goods should be free so to do; that those who may have aptitude to produce special appliances and the special materials we need may do so without let or hindrance, that thereby nothing may be lost to it, and that the general good be enhanced. The dental profession is especially jealous of any interference with these rights. It is involved in this jealousy that dentistry needs its journalism to be free, in order that those who may desire to supply us with our specialties may have a place where they can make themselves known, which they are denied by restriction of space and prohibitive rates freely to do in the leading trade journals. For the moment we set aside and do not desire to discuss here the higher grounds stated in the original article, that those in trade are disqualified to conduct the superior elements of dental journalism; that would be a chapter requiring considerable extension. Suffice it now to state that the consensus of opinion of the world always has been that those engaged in the function of dispensing truth and of the liberal professions, should not at the same time be employed in trade affairs. This maxim is as old as humanity.

We are happy to be able to declare that there are those engaged in supplying us with materials who cannot come under the censures of this paper and the Saratoga address, except so far as they may have been reluctantly forced by pressure beyond their control. Those who can stand in the clear light of heaven and say, "We have not deprived any of their business rights; we have not taken anything from any man, or lied to any," will have no need to make any grimaces. These will not run upon a sword or be pierced by the logic of facts.

The attempt upon the part of the editor of the Cosmos to associate with himself those who have simply acted in an editorial capacity was an ingenious one. He tried to put himself in the company of those who really "are of us." Those he mentions have had no business interests in their somewhat equivocal connection with trade journals, and have done what they could to aid dentistry so far as it were possible in the relations they have held. Those he alludes to are men who have been legitimately instructed in dentistry and in medicine, who have worn their garments on college benches, and have been "sweated" in the faculty-room. They have also been and are now engaged in actual practice, and for these reasons they have been more in touch with their profession and are more truly entitled to be respected and to represent dentistry than those who have not had these experiences.

If the guiding principle of the trade houses were truly the "golden rule," they would declare to their fellow-dealers, "We will place you on equal conditions with ourselves; we will advertise your goods at fair terms and make neither restrictions nor discriminations; let us work together to supply these our common patrons. If you can fairly please them and win their favor, we must submit and take our legitimate share of the patronage; if we cannot equal you in fair and honest competition, you have a proper advantage over us." This would be the "golden rule" sincerely applied. The very presentation of this supposition is absurd from the ordinary business standpoint, and its very absurdity only proves that trade ethics have nothing in common with the love of the neighbor. He who is sincere and who would not deprive his neighbor of anything is willing to allow the most open competition.

When the claim is made that the ethics of business differs from professional ethics, high character of business is surrendered at once, since the principle which underlies all ethics is love for others and includes the consideration of every right and interest of others. Therefore the postulate that there can be more than one ethical standard is an offense to good morals. The mistake is made of confusing rules of business which have relation to the low motive of self-preservation with the higher law of neighborly regard laid down in the second great commandment, "Thou shalt love thy neighbor as thyself," which law is constantly made of "none effect" by rules in substitution thereof.

What is now required are journals which shall be untrammeled, in which opinion may be fully expressed and in which the wares of all dealers may be advertised. This would go far toward securing fair and equitable trade, trade free to all, and place dentistry above the baneful influences of trade journalism.

This is the cause of every dentist, and also truly so of every right-minded dealer, and is an effort necessarily hated by the proprietors of the trade journals, because it means our emancipation from their forcible methods. LOUIS JACK, D.D.S.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular monthly meeting on Tuesday evening, October 15, 1889, in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. J. Morgan Howe, in the chair.

The President. Under the head of Incidents of Office Practice, gentlemen, I shall invite you to present anything of special interest that you may have; but, before doing so, I present for your inspection a new hot-air instrument, which Dr. Bogue has kindly sent me from Paris, with a request that it be exhibited at this meeting. It consists essentially of a tube of metal, with an enlargement about midway of its length, which is to be heated over a flame and then slipped into a hard-rubber sheath, which covers it so that it is conveniently handled; a pair of bulbs, one elastic and the other having a valve, are the means supplied for furnishing air through the heated metal tube. It appears not to be patented, and is made by E. Bidaud and Francis Jean, of Paris, and any ideas that you may gain from it may be utilized in reproducing or improving it. The principal improvement that I notice in it over other varieties is the protecting hard-rubber sheath into which the heated tube is slipped. This affords protection to the hands of the operator and the lips of the patient.

Dr. S. E. Davenport. I would like to ask Dr. Howe if the rubber bulb is not worked by being placed under the treadle of the dental engine, probably?

The President. That is evidently the intention as this is arranged.

If the gentlemen have nothing to present under the head of Incidents of Office Practice, we will proceed to the reading of papers, and I shall have the pleasure of introducing to you Dr. B. Holly Smith, of Baltimore.

B. Holly Smith, M.D., D.D.S., then read a paper entitled "Professional Patents."*

Discussion.

The President. Gentlemen, you have heard Dr. Smith's very able and interesting presentation of this subject. It is now before you for discussion.

Dr. W. H. Dwinelle. I know that Dr. Meriam is on the anxious seat and only waiting to be called upon.

Dr. H. C. Meriam. I did not expect, Mr. President, that I should be called upon to open the discussion on this most excellent paper,—a paper, by the way, which marks an advance in the presentation of the subject. We had the testimony that instruments were shown at the meetings and clinics of dental societies by "practitioners appointed by the dental firms who owned the right of manufacturing." The essayist has happily alluded to another class of practitioners: those sold with the instruments they have patented. We now expect this class to appear in dental societies or journals, "by permission" or "under the appointment" of the instrument-maker who owns them, to discuss this question for us, and I suppose they will say with the pious editor in the Bigelow papers,—

"I du believe that I should give
Wut's his'n unto Cæsar,
Fer it's by him I move an' live,
Frum him my bread an' cheese air."

But how far will that tend to the independence and honor of our profession? I think we may take as the basis of our conduct in this matter one of the passages from the code of ethics of the Massachusetts Medical Society, on

"The relation of physicians to practitioners and to their patients. . . . His conduct should be such as, if universally imitated, would insure the mutual confidence of all medical practitioners."

The question for us is, then, does the patenting of a process or instrument, if universally imitated, tend to the elevation and independence of the profession or to the degradation and dependence of the profession? Shall the future progress be on the line of property rights in processes, appliances, and instruments, or along the professional line,—that is, a body of men engaged in practice of the specialty of medicine and sharing with each other all the knowledge gained from its practice? There is an immense amount of money seeking investment in this country, and men will turn to every opening that promises opportunity for gain. We have only to make it clear that we are a fertile field and pasture green, for them to enter in to feed on us. We made this clear in the days of the Rubber Company, and are we in the future to gather the fagots to roast ourselves? We will not question the right of any man to sell to a rubber or tooth-crown company his inventions in dentistry, but how far can this practice be universally imitated and dentistry remain an independent profession?

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* Dr. Smith's paper will be found at page 1 of the current number.

The leading medical periodical in New England, the *Boston Medical and Surgical Journal*, said in an editorial, "If at times it seems a little unfair that one's improvements on surgical apparatus should not directly bring in a fixed income, the opposite condition, when everybody should exact royalties and conceal the composition of all new drugs, is too terrible to contemplate; and between perfect freedom on the one hand, and patents and copyrights on all new inventions on the other, there can be no middle ground. It is certainly entertaining and instructive to contemplate the unpleasant position which might be, were the general profession to suddenly overturn the present lofty ideal and become a trade." This for New England. Now for Old England, from the *British Medical Journal*, which says, in a book review, "More than half the dentist's work must always be that of a skilled mechanic; if on account of the other part he demands recognition as a member of the medical profession, he must be content to make some sacrifice and conform to such a code of ethics as regulates that profession. No body of men in the world have sacrificed personal gain for the sake of the profession more than medical men. Jenner might have made an immense sum had he kept his secret to himself and traded upon it. There is not a page of our journals which does not record some loving labor freely bestowed by medical men for the advancement of their art and the general good; and if the dentists demand to share the honors of such a body, it is not too much to require that they shall abandon nostrum-mongering and patent rights and combinations."

Dentistry will certainly advance, but in what way? We have depended largely on the selfish side of men. I remember seeing in an exchange column of a domestic journal an offer of some one to exchange some outgrown back hair for geranium slips. If our professional life, as expressed in societies and journals, is not for gathering and recording knowledge on every subject that relates to our profession, to be used by all as from a common store as in the liberal professions, it would seem to be perfectly logical and just for practitioners to offer, in societies or journals, to swap a share of their secret or patented process for making crowns with another practitioner for the right to use his process of vulcanizing rubber or local obtundent. There is, however, a public opinion regarding hospitals, universities, and all educational and humanitarian institutions which make men feel themselves honored by association with them, as is evidenced by the donations and moral support that they constantly receive. Let us then declare through our schools, journals, and societies that our profession is like-minded, and we shall be connected with a force that will be far more powerful than the commercial tide which seems to bear us down.

I may quote again from our New England poet:

> "Be noble! and the nobleness that lies
> In other men, sleeping, but never dead,
> Will rise in majesty to meet thine own."

Dr. Cook. I have nothing to say, Mr. President, except to express my delight that we have had the opportunity of listening to such an excellent paper this evening. I heartily indorse what has been said by Dr. Smith, and I beg to offer him my sincere congratulations. I have here something bearing upon the subject which may perhaps be of interest. The *Medical and Surgical Journal*, of Philadelphia, republishes this from the Paris correspondence of the *New York Medical Journal*, dated February 14, 1888:

"A case of profound interest was decided by a Paris tribunal. A doctor had agreed with a druggist to write articles recommending a certain chemical product manufactured by the druggist, and also to deliver lectures in regard to the product, recommending it, in fact, by all possible means to his professional brethren and the public. In consideration of these services the druggist agreed to pay the doctor four thousand francs a year and certain expenses. Afterward the doctor refused to continue the work for the druggist, who at once sued him. The doctor's lawyer maintained that he could not be compelled to carry out such a contract, as he was not a man of business. The tribunal, however, decided that as the doctor had agreed to do work such as an ordinary commercial traveler did, he was responsible. It was added that a physician should only advise any preparation which he knew to be useful in the ordinary way of giving advice at his office or at a patient's house, and not by advertisements; and that he should not receive any payment for such advice beyond his usual professional fees, under pain of being ranked with the regular mercantile traveler. This would not be a bad judgment on those who recommend certain preparations, for a consideration, in other countries."

Dr. O. E. Hill. Mr. President, I am but little interested in this subject of patents relating to the dental profession, and I am somewhat in the dark as to what it is intended to accomplish by these papers and discussions. Papers are read before the society on this question by gentlemen who are not members, and there is ordinarily very little discussion. If the Odontological Society expects to have any influence upon this question, the members themselves must do something, and in the discussion they must say just exactly what they mean, and not be afraid to do it. I have not taken part in the discussions of this society for about three years, and I almost took an oath at that time that I would never speak in one again. The reason was that members seemed afraid to attack a thing and say just exactly what they meant, without regard to patentees or anybody else. I don't want to deliver a lecture, gentlemen, on this subject, but those are my views. In regard to patents generally, I believe in them thoroughly and entirely. I believe a man has the right to patent an original idea, and no one in any country on this earth, by the law of the land, can rob him of that right. Reference has been made to the rubber patent, and to the Tooth-Crown Company. The profession as a profession had nothing to do with the rubber patent. We fought it all the way through. Why was the profession against it? Because dentists invented the thing, and it was stolen from them and patented. If the dentist who invented the use of rubber for plates had patented it himself and kept the others from patenting it, we would have been a great deal better off. Gentlemen have read in the *Boston Medical Journal* and other medical journals articles in regard to the dental profession. They state that more than half of our work is mechanical. We have to use mechanical tools and appliances, and those tools and appliances are not used exclusively in dentistry by any means. Those things are patented because they are used in general mechanical work. I hold that a man who invents them has the right to patent them. To patent a peculiar shape of crown, or something that we use in the mouth exclusively, might be quite another thing. It is said that the medical profession are against patents. What can we patent about a medicine that a physician cannot use if he chooses to? What is there patentable about a pill? Nothing whatever but the name. A physician may prescribe and give Brandreth's pills all his life; but he is restricted as to the use of the word Brandreth on the box. The name, or label, or something of that kind, is all that is patented, and that is just a matter of registry. I have done it myself. It only costs a dollar to register an article or label. Do not medical men use articles that are patented? Are there not many instruments used by them that are patented? I think so. All this quoting of the medical profession will never amount to anything so far as the influence of this society is concerned. Let us stand on our own bottom fairly, squarely, and independently. As we become better educated and grow more scientific, we will gravitate toward the medical profession.

To go the other way is to go toward mechanics and away from our profession. And as we advance toward the medical profession in scientific acquirements they will recognize us. There are many things we use that are patented. The trouble is not with the individual dentists nor with the profession, but it comes from men outside of the profession and from the patent laws at Washington. If there is to be a fight over anything, fight the way in which patents are granted. Dr. Meriam must know how much of the trouble lies there. Have members of the profession in New York, or Brooklyn, or in societies anywhere, patented anything,—I believe there are one or two in Philadelphia,—except for the purpose of keeping control of it, and giving it, or almost giving it, to the profession? They take out patents simply to protect themselves and the profession. I am speaking now of dentists. When we come to mechanical instruments or appliances that may be used outside of the profession, that is another thing. If I could invent anything that could be of use and value outside of dentistry as well as in it, to any extent whatever, gentlemen, I would not sleep until it was patented. If I could invent something of value that could be used exclusively in dentistry, I do not know but what I might take a nap, but I do not think I would sleep all night until it was patented; if for no other reason, I would do it to protect myself and the profession, and keep the thing out of the hands of these trusts. I do not think dentists are nearly as unprofessional as some would have us believe. Go for those who do the mischief; go for the combinations who get hold of patents and control them for money-making purposes, and do not blame the dentist who does not do either.

Dr. Meriam. If I understand the logic of the gentleman, it is that we should oppose the man who has acquired title to a part of dentistry for commercial purposes, and yet not object to members of our profession gaining exclusive right by patents and selling to parties outside the profession.

It would seem that if a man did not want an objectionable neighbor, the best way would be to prevent his acquiring title to the land near him, not to wait until he had done so and then wrangle about it. An invention, described for record at the Patent Office and patented, even if then given to the profession, does no more to insure it to us than would the same description recorded in one of our journals. And for the future we must be on our guard, and use our journals and societies for this purpose.

The first thing we stumble over is the government's idea in granting a patent; the government does not protect patents, but seeks to secure good records at the Patent Office. For a record that will enable one who is skilled in the art to which the invention appertains to construct or use it without further instruction, the government issues a patent. The invention may be useful or ridiculous ; the concern of the government ends with the record. This will explain many decisions of the courts that seem strange to dentists. When cases come up for decision, you will find that the patent laws are always so interpreted. The man who has a record at the Patent Office stands in a better position in the courts than the man who has but an incomplete or verbal record to offer. In relation to the question of what dentists have had to do with the tooth-crown and other similar companies, Dr. Crouse gives quite a list in the last appeal of the Dental Protective Association. Graduates of Harvard have had some share in it, and in England this has injured the prestige of the school. Granting that knowledge is power, knowledge of our profession is a power to be held in trust by us, to aid in its development, not merely to aid us in earning our daily bread. It should be held for the profession, and not bought and sold.

In talking with a medical gentleman in Boston, who went over this question carefully with me, he asked about the injury done in obtaining and selling patents, and I said to him, "Let A obtain a patent on so much dentistry as he has invented, and sell it to B ; C also obtains patents on what he discovers of dentistry, and sells to B ; and D patents so much of dentistry as he claims, and sells to B ; now who owns the most of the dentistry?" He answered, "Certainly, the man that bought most."

Take the mechanical appliances of medicine, the work of the oculist, for instance ; have we had an oculist company formed? Have we had an orthopedic company, or has the control of these and other instruments used in medicine been retained by the profession? In the Children's Hospital in Boston they have fitted up a place where they make their own appliances. At the Massachusetts Hospital they are now fitting up a similar shop. It was said at a meeting in Boston "that the condition of things in dentistry in regard to instruments and appliances would not be tolerated for twenty-four hours in the medical profession." I do not recollect any patent that is dangerous to the profession that has not been made so by some member passing knowledge of dentistry out of our control.

Dr. Hill. Dr. White asked me several years ago to let me put my name to a certain instrument as having first suggested it. I said no, by no means ; if I do not get a reputation till my name is attached to Dr. Hill's pattern for a certain sort of excavator, I never want it. How often we see in the advertising columns of the journals some man's name just above some little thing that is sold. That is worse than patenting. That is the way I look at these things ; and I talk just as I think. And anything that I have said I hope no gentleman will take personally, for I always speak on general principles. Look at the Johnston Brothers. Ought they to have patented their hand-piece? Of course they ought. Ought they to have patented their chair? Of course they ought. I said to S. S. White on one occasion, "You owe Johnston Brothers as inventors more than they do you. We never would have had that engine, or that chair, or that hand-piece, but for the Johnston Brothers." What answer did I get? Sharp, cunning, and as true as gospel: "You are right, Dr. Hill; but the Johnston Brothers have not the capital, and we have, and we propose to take that talent and genius and with our money develop it." Was it not cunning? Was it not sharp and business-like, and was it not true?

Dr. S. G. Perry. I wish it was true that I had never patented anything. I was led to patent the separators, because I believed they would be better manufactured and I was promised that they should be made cheaply. It operated very fairly: you all have them; they have been well made, and I don't think there should be complaint about them. From the partial success I had in that matter I was led to take out a patent for my part of the engine. It has not operated as well as with the separators. I have a great many letters from dentists throughout the country asking me where and how that engine can be obtained; one gentleman in particular saying he would very much like to take one with him to the other side of the world where he was going. I had to reply to him, as well as to all others, that I could not help him in the matter; that if the engine which I have in use should be destroyed by the burning of my house, or lost in any other way, I do not know how I could replace it.

There is a principle involved in this question of patents. I believe Dr. Meriam is on the right side of the question, though I did not indorse all that was contained in his paper, and that this is a move in the right direction. I took occasion some time since to place myself on record as fairly and flatly as I could as being hereafter against patents, and I propose to finish my professional life on that basis. As a profession we will certainly move in one of two directions: either in the direction of greater perfection of mechanics, or in the direction of medicine. We have to choose between the two. Nearly all our past history would imply that our course in the future must result in the elevation of the profession and its closer relations with medicine, which will induce a better and more congenial spirit between us and the medical profession. If we continue this habit of taking patents, we shall not be so readily received into fraternal relations with the medical profession, for, say what we will, interest in patents will not encourage a true professional spirit.

Dr. Hill. I think the experience of Dr. Perry with his engine would point us to an amendment of the law regarding patents. I think we should direct our efforts to procuring the passage of some law to restrict the time when a patent may be held without use; that after a reasonable time, if the patentee does not furnish the article, the public may have the privilege of making and the benefit of using it. We are not alone in this; everybody is in the same boat in this matter of patents.

Dr. Dwinelle. I rise especially to commend the paper we have listened to to-night. I think it is worthy of all praise. Dr. Meriam's recent paper on a kindred subject covered the ground, but in a somewhat different direction. It was very comprehensive; but Dr. Smith's paper goes into more delicate distinctions that are exceedingly clear and lucid; it has a different tone, and presents the medico-legal aspect of the question. I am so pronounced upon the principle embraced in this subject, and have spoken for so many years upon it and in its favor, that there can be no doubt as to my position in the premises. I simply wish to indorse Dr. Smith's paper heartily; and I know it has been as heartily indorsed by the other members present. He is entitled to our sincere thanks for it. It seems to me that he has made the proper distinction between the professional and legal aspects of the matter, and on that rests the whole subject.

Law and equity are presumed to go together; they do unless law is perverted. Law is made of precedents in the form of decisions; a few of these resolve themselves into authority and become law, which we are bound to obey; for, as Jefferson has said, "it is better to obey a bad law so long as it is a law, then take the first measures to repeal and correct it." By inattention to our interests we have suffered bad laws to gain precedent and power, and thus have ourselves unwittingly forged the chains that to-day hold us in servitude. In the future we should be jealous of all aggression upon our rights, and protect ourselves against all new laws to our injury. Many of us were inducted into the profession at a time when it was exceedingly degraded. Our object has been to elevate it and bring it up to the highest stand-point of humanity, generosity, and liberality, recognizing the great past to which we owe all that we are at the present time, or much of it at least. But for what we have received we would not be in the condition that we are to-day. Freely have we received, as freely should we give. So it behooves us to regard it in that light,—in the light of the history of the profession, in the light of a generous profession, in the light of all that is calculated to elevate mankind. As a profession we have higher claims than almost any other; I will not except medicine: we are so allied to medicine that we can, with our larger contributions to science, claim a higher standard and a higher position. Our profession should be the very expression and embodiment of nobleness, generosity, and appreciation of what has come down to us from the past. We, in our little lifetime, with the past behind us, should contribute to mankind our small quota in return for that which has been bequeathed to us. Our profession should be noted for its humanity, its high honor and sense of justice, and its obligations to the past; for its liberality and success in promoting the welfare of mankind and for its nobleness, for

> "Who noble is may laugh to scorn
> He who is but noble born."

Dr. William Jarvie. Mr. President, I did not intend to speak upon this subject, but a thought occurs to me that is somewhat different from anything I have heard in the discussion to-night. The paper, to my mind, is a most excellent one. I think it drew the distinction and showed the lines between a trade and a profession finer than any paper I have ever listened to; and in theory I thoroughly believe in the non-patenting of inventions that may be made by dentists. But if we are as a profession anything at all, we are eminently practical. How does the non-patenting of inventions in dentistry work? As we are situated to-day there are many men in our profession, a majority of them I hope, who are liberal-minded and honest, and ready and willing to give all that they may acquire in the way of knowledge and inventions to their profession, in return for what they have been getting from others just as freely. At the same time there are other men in the profession who are not so high-minded, men who will take advantage of an opportunity to make money out of patents on dental inventions that were originated by others. We know that our friend who has just spoken (Dr. Dwinelle) many years ago gave us ideas that have since been patented; for instance, the screw as used in supporting fillings, and other devices. He published about thirty-five years ago a small pamphlet which, if it be read to-day, will be found to be full of good and original ideas. Would it not be better for the profession if men who originate some device or appliance in dentistry would patent it, so as to control it, and prevent it from being taken advantage of by unprincipled people, and then give it freely to the profession through publication in the journals? We would thus have a double protection against the dishonesty of those who patent the inventions of others and who use these same patents to oppress the members of the profession.

It has been suggested that we might bring a strong influence to bear against the taking of patents for inventions by members of our profession by excluding such from membership in our societies; but there are men in the profession who are not members of societies, and who care nothing about admission to them; they are after money, and they will take means of getting it that we would not; therefore we must look at the matter in a practical manner.

Dr. J. B. Littig. That is all very well; but when a patent is granted to a dentist it may be bought up, perhaps from his family after his death; and unless some arrangement is made by which it can be secured to the profession by law, the profession will have the same trouble that it now has.

Dr. Cook. It seems to me that Dr. Hill either has a bad memory or he does not read the journals, for had he read the discussion of Dr. Meriam's paper that was presented before this body he would see that the members of the Odontological Society did at that time have considerable to say. Moreover, this society indorsed Dr. Meriam's paper heartily and fully. I hardly ever saw more enthusiasm in a meeting of the society than was shown at that time. Evidently the shot told; for directly we had an apology offered to the dental profession by the American Dental Trade Association, termed by it an "explanation," which it is fair to believe would not have been made except for such papers as those of Dr. Meriam, Dr. Holly Smith, and others who have taken part in these discussions of professional ethics.

We have a right to judge of the future by what has occurred in the past. They have not apologized or "explained" very much in the past seven years. I think that Dr. Hill lost sight of a fact which was positively and directly stated in the paper, and that has been constantly admitted in all the discussions that I have had the pleasure of listening to; that is, the legal right of a man to patent his inventions. But there is a difference, which appeals to us, between a professional and a commercial transaction. If I patent an article which is used in dentistry, for the purpose of selling and making all the money out of it I can, and then come in and discuss the merits of it before a professional body like this, and insist upon my right of membership in such society, should I be admitted and recognized on a professional basis? Commercially I am all right; I can stand outside without question as to my individual right to patent articles; but the question is whether a man is in good professional standing in doing these things, and shall he be elected to membership in a society after having patented an article used in dentistry for his own pecuniary benefit? That is the point which the gentlemen have, I think, lost sight of in discussing this question. I may allude to the fact that these papers and discussions have attracted the attention of dentists throughout the country, and Dr. Patrick has been constrained to write quite a lengthy paper on the patent side of the question. The part of his paper that I have read seems to beg the question altogether; at least it does not discuss it from the stand-point from which it has been discussed here. It seems to me that the man who advocates the right of an individual in the profession to take out patents upon a professional appliance for his personal and pecuniary benefit, and defends it as being professionally right and proper, cannot understand or realize the difference between a professional and a commercial transaction.

The President. The discussions of this subject, especially before this society, have been very interesting. The question seems frequently to be whether a professional man as such shall have the honor of contributing to his profession something of value after he has adopted, by patenting, the measure for obtaining all the money he can get. In other pursuits the honor seems often in direct proportion to the amount of money an invention proves to be worth, but in a professional calling such matters may be judged by a different standard. Such a presentation as we have had to-night is especially welcome. All such discussions must bring us nearer to a correct decision. If no one else wishes to discuss it, we will pass the subject; and I have the pleasure of introducing Dr. C. B. Parker, of Brooklyn, who will read a paper on combination fillings.

Dr. Parker then read the following paper, entitled

ZINC-PHOSPHATE AND ALLOY FILINGS MIXED, AS A FILLING-MATERIAL.

Probably no earnest worker in dentistry can look back on any year of practice and feel that the success achieved was all that he desired or had hoped for, and yet how few have paused and investigated the cause and possible remedy of any failure or series of failures.

There are many causes which combine to make dental operations necessary and which also work against their permanency, among which I will mention faulty organization and construction of tooth-tissue, slow and imperfect nourishment of the same, the situation and surroundings of the teeth, and the circumstances governing their use. Unlike the other osseous structures of the body, the teeth stand continually exposed to the destructive influences of numerous active, external, antagonistic agencies to which they offer resistance in proportion to their consolidation, vitality, and use. The important question for dentists to consider is, how shall dentistry best meet these demands laid upon the profession by disease and decay? The selection, then, of the most appropriate substances with which to do the work of replacing wasted tissues and of successfully warding off fresh attacks of decay is a matter of no inconsiderable moment. The facts just mentioned, and a knowledge of the responsibility under which I had placed myself by adopting a calling in which the saving of teeth is the prime object, led me to conclude, after the use of the different filling-materials had resulted in failure after failure, that a new filling-material should be found, if possible, for the majority of children's teeth and for that class of broken-down teeth in which it is advisable to use something besides gold. A case of the latter class presents itself, and we consider and reject amalgam, gutta-percha, and zinc phosphate, all three possessing peculiarities which unfit them in one respect or another for permanency within such surroundings. What do I use in the majority of such cases? Zinc-phosphate and alloy filings, mixed and prepared for filling as we would the ordinary zinc-phosphate cement. This preparation must not be confounded with the amalgam and cement spoken of by some one some time ago, for it is an entirely different substance, and they can have no possible relation to each other.

This preparation, I claim, after five years of constant use, is far superior to any cement I know of, and I think I have gone through the whole list. I call it an alloy cement, for if it be examined in the mouth it presents a metallic surface, and it will be noted that the specimen which is being passed around presents the usual cement surface, consequently it can be used anywhere that the ordinary cement can, except, of course, on the labial surfaces of the anterior teeth. Why, then, is it superior to any other cement? First, it has all the qualities of any cement; second, it always presents a metallic surface, consequently it is worn down but slowly by mastication, and in many mouths no perceptible change has taken place in several years; third, as to conductibility it is better than either of the strictly metallic or cement preparations for sensitive or nearly exposed pulps. It is as near a non-conductor as gutta-percha, though why, I am free to say, I do not know, unless it is that neither metal nor cement is continuous. In very frail molars and bicuspids tooth-substance need not be destroyed, for it will attach itself as will the ordinary cement, and it is practically a metal filling.

I have learned more about this material in the past year than in the previous four years. Much depends upon the character of the alloy used, as the component parts of the cement and metal must be congenial.

I have spent considerable time in preparing a gold-alloy cement, but have not been well enough satisfied with the results to speak positively concerning it. However, I think I am now upon the right track, and hope in the near future to present this society with a gold-alloy cement which will be worthy of notice by the profession at large. I do not wish it to be understood that I prefer plastic fillings to gold, but if we are obliged to use them we should use the best.

Discussion.

The President. Will Dr. Parker tell us how he prepares this filling?

Dr. Parker. I left that out almost on purpose, because to state it fully would necessitate quite an addition to the paper. If I was to say that I use alloy filings as prepared for amalgam, and the ordinary oxide of zinc cement, there would be a great many who would say it didn't amount to anything. But that is not all. The alloy and zinc phosphate must be congenial. The oxide, as I prepare it, is, as near as I can make out, very similar to the dento-plastique that the White Company manufacture, and the alloy is silver, tin, and a little platinum. There are a great many alloys which contain either copper or zinc; and if there is very much of either of those metals in the alloy, the filling will be a very imperfect one. I have found that in order to get a perfect filling, as I think I have it now, the ordinary alloy that is in the market or the ordinary cement must not be used. The proportions of cement and alloy that I use are about equal, one-half of each, and it is prepared as one would prepare an ordinary zinc-phosphate cement filling. I have experimented with different cements, and I find that the dento-plastique that the White Company makes is better than anything I have found outside of what I have made myself. I have specimens of both, and one can hardly tell the difference. A gold-alloy cement would present the same gold surface as a cement made of silver does of that metal.

The President. Does Dr. Parker think it makes any difference as to how it is mixed? Would it answer to mix the oxide of zinc and phosphoric acid, and then mix in the filings afterward?

Dr. Parker. That is the way I began in the first place, and I found that I could not get it thoroughly mixed; it will not work well in that way; one section will be all cement and the other all alloy. The filings must be of medium grade, neither too coarse nor too fine.

Dr. Perry. Theoretically, Dr. Parker has struck a good idea, and practically, too, I am sure. For many years I have occasionally used pulverized artificial teeth mixed with the powder of ordinary zinc phosphate. I smash them in the mortar and select the medium grains. Some of the fillings made from that material have lasted astonishingly, and some have not. I think Dr. Parker has struck something that will be of value; such a combination of materials I believe will materially increase the wearing quality of zinc-phosphate fillings.

Dr. Parker. The last patient I saw this afternoon happened to be the one for whom I first tried this method, five years ago last May. I used it in the four sixth-year molars, which had been filled repeatedly, and there was hardly anything left of them; yet the cuts I made in the fillings in order to make the cusps are still there; there has been hardly any change in five years.

Dr. Davenport. May I ask whether Dr. Parker has noted particularly the wearing qualities of these fillings down by the gum? I have found that a good zinc phosphate will wear very well on masticating surfaces; indeed, some fillings wear astonishingly well there, considering the materials of which the filling is made; but I seldom use the material on approximate surfaces, except in children's teeth, because of its liability to become disintegrated from contact with the secretions, particularly of the mucous glands.

Dr. Parker. I think that is the weak point in all cement fillings,—anywhere about the margin of the gum, below or above it,—but I find that in wearing qualities this cement is very superior to any other that I have ever used or know of. Of course there is a slight disintegration, but very slight. In those cases I usually, when the cavity is large, put in a layer of gutta-percha; I use gutta-percha up to the margin of the gum if I am obliged to use a cement filling.

The President. Dr. Parker told me about his use of this mixed filling-material several months ago, and I have used it some. There seems to me to be a little more in it than a mere mechanical mixture, in this particular, that the phosphoric acid seems to act on the filings of metal, as it takes hold, you know, of the spatula with which you mix it. The result, so far as I have been able to discover in the few months I have used it, is that the chemical action of the liquid upon the filings causes them to be united more mechanically in the mass; that the surface is wasted, so far as the zinc phosphate is concerned, by the usual processes of disintegration, leaving a metallic protecting surface, which checks further disintegration, so that in a little while the filling has the appearance of tin. Of course I have not used it long enough to warrant me in expressing a positive opinion about it, but from my observation thus far of its working and wear I think it is eminently worthy of your careful consideration and experiment.

Dr. Parker. That is why I spoke as I did about the metals and cement having to be congenial. I would not advise the use of the alloys promiscuously.

Dr. J. F. P. Hodson. Which one of the alloys would you advise the use of?

Dr. Parker. Any alloy that is composed of silver and tin. If there is a little gold or platinum in it, there will be no harm; but if there is copper, zinc, or cadmium there will be failures.

The President. I have used an alloy composed mainly of silver and tin, with a little gold, about three per cent. gold, since Dr. Parker told me of this.

Dr. Perry. Is Dr. Parker willing to give us his formula, step by step, in the whole proceeding?

Dr. Parker. The alloy is composed of forty parts of silver, sixty parts of tin, and three parts of platinum. I prefer platinum to gold. That makes one hundred and three parts in the mixture. I began with forty parts of silver and sixty of tin, and thought it was all right. Then I added three parts of platinum, which I found was an improvement.

A voice. How would it do in these fillings to apply mercury afterward, so as to amalgamate the surface?

Dr. Parker. I presume that would be a very good way; I don't see any reason why it should not, although I have not tried it. The cement is composed of two hundred parts of oxide of zinc, five parts of borax, eight parts of silex, and about six parts of glass, with phosphoric acid to dissolve to the consistency of glycerine.

Dr. J. P. Geran. I would like to ask whether any gentlemen present have experimented with precipitated gold and zinc phosphate combined. I have sometimes had fine results from it, though I have not used it much of late years. I recently saw a filling of that kind which I put in about five years ago, and it was in a fair state of preservation. I used precipitate of gold about one-third, with two-thirds of zinc phosphate. After it sets well it can be burnished.

Dr. Cook. Why did the doctor discontinue the use of this combination filling? He said he had used it very little of late.

Dr. Geran. I had so many failures with it, as we do with zinc phosphate alone, that I gave it up. Neither have I confidence in zinc phosphate.

Dr. Benjamin Lord. I believe that zinc phosphate has an important place among the materials for the preservation of the teeth; but it must be a good article. We all know that there are a great many poor preparations in the market. I have used the addition of alloy filings two or three times, as Dr. Parker was kind enough to send me a small quantity for experiment. I should think that the addition of the metal to the zinc phosphate would add to its wearing qualities, as has been suggested. Certainly the metal will make the filling harder, and there will be less action upon the zinc phosphate by the secretions. In this sample that Dr. Parker sent to me the zinc phosphate appears to be very strong and sticky, and it occurred to me that that would be a very important quality. Some of the phosphates are very poor; that is, there is no tenacity in the mass after it is mixed, and I do not think that kind would be suitable to add metal to.

On motion of Dr. Jarvie, the thanks of the society were tendered to Dr. B. Holly Smith, of Baltimore, and Dr. C. B. Parker, of Brooklyn, for preparing and reading their excellent papers.

Adjourned.

S. E. Davenport, D.D.S., M.D.S.,
Editor New York Odontological Society.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, November 12, 1889, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. A. L. Northrop, in the chair.

Dr. V. H. Jackson, chairman of the Clinic Committee, read the following

CLINIC REPORT.

A stated clinic of this society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street.

Dr. J. E. Waitt, of Boston, Mass., presented a varied and instructive clinic. He placed a gold filling in the mesial surface of the second right superior bicuspid, to demonstrate his method of rapid contour filling *without* the aid of a matrix. In preparing the cavity no retaining-points are made, but a fine groove is cut entirely around the walls, including the cervical portion. The crown portion is dovetailed somewhat, to prevent the filling from being thrown out by mastication. In the preparation of the foil lies the secret of the work. The doctor uses foil made by the Boston Dental Manufacturing Company, put up in ropes Nos. ¼ and ½, from which he makes cylinders by folding it upon itself with the foil-carriers, of such size when rolled that three of them will cover the cervical wall when placed in position. The cylinder is then squared by being pressed between the blades of the foil-carriers, thereby partly condensing it. The length of the cylinder is to be a little more than the depth of the cavity antero-posteriorly, so as to allow of being condensed endwise, thereby giving the contour. After each layer is put in position and thoroughly condensed, it is locked in place with the Boston Company's No. 4 Soft Crystalline Gold, single thickness, made cohesive by slightly heating. Being used in this manner it is thoroughly united with the soft gold by mechanical force. When the first layer is finished and locked, he proceeds with the second, third, and, if necessary, the fourth. After the locking of each layer it is burnished until the contour is as needed, and all surplus foil worked off. The cutting surface may be finished in the usual manner with cohesive foil and mallet. A filling inserted in this manner practically needs no disk or file work upon it, as it is completely finished as the work progresses. . . . Dr. Waitt also presented a new ether inhaler, the invention of Dr. Horace Packard, of Boston, Mass. It has a metal cone shaped like an hour-glass, with a cap for a cover, and a depressed cone for the base, around the edge of which is a series of small holes. A perforated card-board is placed inside of a Turkish towel bag, and then the towel is brought snugly around the neck of the metal cone and fastened with good-sized pins. It is claimed that ether administered with this inhaler requires but from three to five minutes to produce unconsciousness, and also with about one-third to one-half the usual amount of ether. . . . The doctor then presented his nitrous oxide light. This is a modification of the oxyhydrogen light for micro-photographic purposes, and by which ordinary illuminating gas and nitrous oxide gas are combined in a small, separate chamber made of brass, and from thence carried to the lime-holder and burner, where an intense white light is produced. The light may also be used for stereopticon purposes, thereby doing away with the cumbersome oxygen and hydrogen cylinders. . . . Dr. Waitt then showed his home method of making mouth-mirrors. A die of tool steel seven-eighths of an inch in diameter and three inches long, and a counter-die of lead respectively three-fourths of an inch, one inch, and one and one-half inches in thickness are used. The counter-dies are made by building sand about the base of a tumbler to the height of their thickness, then withdrawing the tumbler, and placing in the center of the mold the steel core. Lead is then poured into the mold and around the steel. This gives a counter-die with a hole through it the size of the mirror back, and through which the circular disks of brass are drawn, thus forming the back. The wire for fastening to the backs is No. 12 size, and for the ferrule No. 2 B. and S. The ferrule is turned from the end of a piece of No. 2 wire, and drilled so as to slip on to the No. 12 wire and then soldered, and also to the back of the frame. The handles may be turned from any fancy wood and to any desired shape. The mirror-glass is German plate, waterproof back, and may be purchased at any mirror manufacturer's. It is cut into disks one-sixteenth of an inch larger than the frame, and is ground to fit with the S. S. White finest grade corundum stone. He gets the disks of glass cut at a steam-gauge manufactory, on a machine used for cutting the glass faces. The cost complete of these mirrors when once the materials are ready is about seventeen cents apiece, including the plating. . . . Dr. Dwight M. Clapp, of Boston, Mass., demonstrated his method (which has attracted so much attention recently) of making a combination filling of amalgam and gold, with the use of a matrix. The amalgam is used as dry as practical, and Steurer's plastic gold is then inserted until a perfect union is formed. The filling may be finished with any cohesive gold, according to the preference of the operator. The doctor also showed how easily a filling may be started with plastic gold in cavities without angles or pits, as a large oval cavity in the buccal surface of a molar, and doing away with the necessity of squaring the cervical portion in approximal cavities in bicuspids where the tooth is already the weakest. The filling can be finished with the same or other gold. The doctor recommends the use of a disk-carrier on the right-angle attachment to the engine, for approximal cavities difficult to reach. He also showed a beautiful little scaler, of which he has different sizes, for removing deposits from near the end of the roots of teeth. About one-sixteenth inch of the point is made square, and slightly pointed, and a little larger than the round shank, which is curved to proper angle. . . . Dr. B. S. Byrnes, of Memphis, Tenn., filled an approximal cavity in the right superior incisor with cohesive foil No. 40, to demonstrate the easy workings of his engine mallet, which can be readily attached to any hand-piece, at the same time demonstrating a strong system of anchorage used in his practice. The tooth is prepared as usual for an approximal filling, and a dovetail is formed on the cutting-edge by cutting away a portion of the sound tissue with corundum stone and file, and drilling pits to hold the gold in place that forms the L of the filling. If there is decay at the cervical border, a corresponding L or projection is made. . . . Dr. J. S. Campbell, of London, Eng., presented his horizontal pivoted dental engine, the running parts of which are concealed under the foot-board of the dental chair, and so arranged that the pillar-post and foot-treadle can be revolved to either side of the chair. It can be folded and covered entirely by the foot-board when not in use, and for transportation. . . . Dr. E. T. Starr, of Philadelphia, presented a Bonwill mechanical plugger having a rubber handle, adapted to carry the long-handled electric plugger instruments, which is so arranged that a pellet of gold can be carried into the cavity while the instrument is in motion, and two or more blows delivered on the gold at will. . . . Dr. C. F. W. Holbrook, of Newark, N. J., presented a patient with a full upper and lower "Ward's Electro-Metallic Dental Plate," with block teeth waxed in place ready for investment, which will be completed for the next clinic. The adaptation seemed perfect. . . . Dr. L. Ashley Faught, of Philadelphia, presented some specimens prepared by Dr. William R. Hall, of Philadelphia, showing his method of attaching gold to plate and crown teeth in any part, including cutting-edges, to represent fillings of beautiful finish, and stronger than the old system, which he proposes to insert for the profession at a moderate cost. A slight depression ground into the tooth is filled with pure gold, which is burned in and afterwards polished. . . . Dr. Horace Dean, of Jersey City, presented a patient, a girl aged eighteen years, with an epulis growing from the alveolar border between the second and third left superior molars. Dr. Atkinson advised the removal of some of the alveolar process with the growth, by the use of a bur in the dental engine. . . . Dr. Dean also presented a patient with caries of the bone above the incisors. Dr. Atkinson suggested that the opening be dilated with a cotton tent dressed with oil of cloves and creasote, and the dead bone removed with a bur in the engine. . . . Dr. C. A. Heller, of New York, showed a very interesting model of the mouth of a patient aged nineteen years with the bicuspids and incisors bunched on either side of the arch, leaving a space of about three-fourths of an inch between them (with no teeth in the space the incisors should occupy). It was recommended that the most irregular teeth be extracted, and a bridge with porcelain gum be inserted.

Dr. W. W. Walker. Mr. President and Gentlemen: Before the reading of the paper of the evening, it may not be out of place for me to make some explanation regarding the phonographic reproduction of which the members of the society were notified in the announcements of this evening. It is often the case that a carefully prepared paper falls flat for want of proper discussion, and in order to obviate that, the idea of using the phonograph occurred to one of our members, and, after consulting with an officer of the phonograph company, and with the assistance of Dr. Kirk, it was arranged that Dr. Faught give a preliminary reading of his paper in Philadelphia for the purpose of having it discussed by Philadelphia dentists. On the Saturday evening preceding this meeting there assembled in Dr. McQuillen's office in Philadelphia eighteen or twenty prominent dentists, to whom Dr. Faught read his paper. It was discussed by Dr. Kingsbury, Professor Truman, Dr. Head, Professor Guilford, Dr. Dean, Dr. Roberts, and Professor Laplace, who spoke into the phonograph, and by it their remarks were recorded. We have here to-night the phonographic cylinders on which that discussion was recorded, and after Dr. Faught reads his paper and it has been discussed by members of this society and our visiting friends, the Philadelphia discussion will be repeated by the phonograph.

The president then introduced Dr. L. Ashley Faught, of Philadelphia, who read a paper entitled

Some Notes on Methods of Practice.

Mr. President and Gentlemen: It is not without some timidity, and many misgivings as to my ability, that I have consented to appear before so honored a body as the First District Dental Society of the State of New York, and essay to lead its thought to profit this evening. In treating any important and comprehensive subject it will inevitably happen that some portions of it will be found less interesting than others. In every book we read, some chapters will be less instructive than the rest; every landscape has its less impressive features, and every journey has dreary and laborious stages. Yet we must accept them as a whole,—the poor with the good. This is my apology for presenting to you, at this time, some notes on methods of practice, and I bespeak your kindly attention to what may in them make your convictions firmer or your feelings stronger, even though in other respects they excite but little interest.

In the first place, I desire to disclaim any intention of coming to you with views of my own, for there are many here present who are older, abler, and better versed in methods of practice than myself. To-night, you yourselves shall be both pupil and teacher, for I come to you with your own teachings and will endeavor to hold up before you your own methods. I shall try to be but the mouth-piece to speak to you the testimony of the profession. I desire to pass from the mind of the individual, and get at the intellect of the profession. Let us together learn from it what we may.

I need hardly say that a careful review of the practice of dentistry will present, in many directions, many methods to attain any given end. The young practitioner seeking light is bewildered; for this method has weight of authority, but so has that, and another, and another, *ad infinitum*. "Which," queries he, "can be right? At least, what am I to consider as the accepted practice of the profession?" Who can tell him? Truth seems to be everywhere; yet tangibly, nowhere. The ever-recurring case calls for repetition of experimentation, and many of us who, wearied by it and seeking rest, have fallen into ruts, are frequently not a little mentally disturbed at the intimations received that our rut is after all a side-track when compared with that of another equally conscientious brother, who advocates his as the main one.

Multiplicity of methods without definiteness or system in practice, is one reason why we *talk* of dentistry as a profession. True dignity of position lies in *doing*. A work filled with many methods, and replete with them all, claims to be the "American System of Dentistry;" yet neither old nor young practitioner, nor fresh recruit, can turn to any portion of it and read that this is the accepted practice of the profession in any given line of treatment. He can select one of the many methods and use it experimentally, as all other dentists have done in the past, obtaining a basis of practice which in the future will be peculiar to himself. He cannot, as the physician does, learn of collateral methods yet know that in *one* is the general, accepted, and universal method of practice; that the majority of his brothers would so treat even as he was about to do; and that from it certain definite results could be reasonably expected.

Is not this fact a sufficient explanation why many of our societies are at times without dignity in their meetings, when we hear, as I have heard again and again, men of equal years' standing in practice tell each other that they know nothing of practical dentistry? Surely it fully accounts for much of the desultory talk which we hear in all of them. Vain efforts to thus settle for time, questions, which like Banquo's ghost are never laid. Yet following one rule ought not to be empirical practice. The reason is, gentlemen, that night after night we meet and *talk*, and that from it nothing is formulated for the profession, whatever may mentally be done by individuals for themselves. It is assertion, but not comparative demonstration. That these things ought not so to be I have felt for some time ; and to turn thought in the direction of securing unity in many methods of practice, I invite your attention to the following statistics :

I have taken the DENTAL COSMOS as a representative journal, and made a careful examination of fifteen years, from 1874 to 1888, inclusive, for certain information. I have enumerated and tabulated all who advocate methods in certain directions by original paper, or by voice in meeting, even though the voice only said, "Those are my sentiments ;" and to establish a basis of comparison for study I have assumed that it seems reasonable to infer that workers desire the widest promulgation of their convictions.

Such then being the oracle, let us ask that we may receive.

How gladly does the profession seem to rush to it and press for an answer to their heart's idol. The one query they have hugged to their breast from time immemorial. "Tell us, tell us," they cry, "what is the accepted practice of the profession in root-filling?" The answer which the records give is, that during these years, through the medium of original contribution and reported dental discussion, eight substances have been mentioned, viz : Lead, wood, shellac, oxyphosphate of zinc, oxychloride of zinc, gutta-percha, gold, and cotton variously medicated. The number of advocates for each is : Oxychloride of zinc, twenty-one ; gold and gutta-percha, each sixteen ; cotton, variously medicated, eleven ; wood, six ; cotton, medicated with creasote, four ; oxyphosphate of zinc, three ; shellac, one ; lead, one ; unfilled, one. In all, eighty who advocate anything ; and upon the basis of comparison, they must be a just proportionate representation of the profession, for he who advocates is a college of practice.

This being the case, no substance has a majority, nor even a third, of the profession in its favor. The profession has answered itself,— that there is no accepted method of practice in root-filling.

The next query is, "Does the profession enlarge root-canals?" The testimony from the same source shows that there are seven advocates in favor of, and five against it. It is therefore accepted practice to enlarge canals by reason of this seven-twelfths of the profession favoring it ; and this raises the question, "Is the minority generally in the right?"

The next problem that seeks solution is, "What is accepted practice in pulp-capping?" We find that the operation is divided into the medicament first applied, the cap, and the probationary filling. The advocates under each division are as follows:

Medicament—creasote, thirteen; carbolic acid, eight; oil of cloves, two; balsam of fir in chloroform, two.

Cap—oxide of zinc, with medicament other than chloride of zinc, fifteen; paper, six; gold-beaters' skin, two; lacto-phosphate of lime, one.

Probationary filling—oxychloride or oxyphosphate of zinc, twenty-eight; Hill's stopping or gutta-percha, six.

The accepted practice is, therefore,—medicament, creasote; cap, oxide of zinc with medicament other than chloride; probationary filling, oxychloride of zinc or similar cement preparations.

I have chosen to work out and bring to you these queries in illustration of the points advocated by my paper, for certainly there are no queries like them. They have been ever before the profession, and are subjects upon which has been presented the most testimony. There are many, many others.

I have another query of different nature, but perhaps of no less interest:

Is dentistry a specialty in medicine? The answer, according to the *methods of practice*, is that the number of subjects discussed by the profession in its typal journal during a period of sixteen years was two hundred and fifteen, of which thirty-nine related to materials and drugs, and thirty-eight to pathology and therapeutics, making a total of seventy-seven in all. In other words, only one-third of the whole number had any relation to medicine. By exclusion, therefore, the rest of its ideas must have been truly dental.

The most marvelous thing, however, revealed by the analysis of the past seven years is the fact that the profession, as represented by its writers, has devoted the greater proportion of its powers to the study, development, and consideration of crown- and bridge-work. This has had prominence and preferment above every other subject. The discovery of this fact gave your essayist much food for meditation, as it probably will many of you, for it was difficult to ascertain where, in the practice or even in the theory of medicine, such mechanical subjects found their place. The conclusion, therefore, is that dentistry as revealed by its literature, the representative thought of the profession, is not a specialty in medicine.

The answers to these various questions, gentlemen, have of course only an indicative value, but I would suggest that it might not be without profit to the profession if this society, or another of equal prominence, would arrange with the local societies all over the country, so that all should meet once or twice each winter in their respective places on the same evening, or on an evening in the same month, for the purpose of discussing the same subject; to the end that each society ascertain by such discussion how many advocates among its membership any method of practice may have, and report the same to the association controlling the movement. The published report of this central association would exhibit from time to time the status of any method, and indicate the accepted method of practice of the profession in any given operation.

In conclusion, gentlemen, I would like to accentuate if possible this suggestion, for I believe it to be the only method by which an absolute "record of *practice*," and "not of theories," can be obtained. Committees on practice operating, as that appointed by one of your neighboring societies, cannot reach the desired result; for you have had your attention called to-night by my *statistics* to the fact that but few in the profession have placed their individual methods of practice before it. The *opinions*, therefore, of a committee composed of a limited number of men expressed upon the practice of this advocating few, falls far short of being a true representation of the methods of practice of the profession. In this era of progress the profession should obtain its own full voice.

The President. Gentlemen, you have heard this excellent paper, which no doubt will be of interest in the practice of every dentist present. The paper is now open for discussion, and we invite all present to take part, whether they are members of our society or visitors from other cities. Will Dr. Atkinson please open the discussion?

Dr. Atkinson. Mr. President and brethren, I have only commendation for the effort in preparing the paper upon this subject; but to take it as at all an adequate expression of the status of the methods of practice would lead us into difficulty. It simply says that we are as yet without data and without doctrine; that we are without a knowledge of the basal principles upon which we operate every day *nolens volens*. Now that is a sort of grunt, confessing ignorance without showing us the way out of the woods. Who constitute the profession? My observation has been that every man who is worthy to occupy a position has conquered a territory in his immediate neighborhood by which he becomes the standard of his neighborhood as to doctrines and methods of practice. The great difficulty has been that we had supposed that we had arrived at a sufficient amount of tabulated knowledge to formulate a syllabus, the study of which would qualify men for practice. Men efficient in the saving of human teeth from destruction have to be born. They are not made by any system of instruction or curricula through which they are required to go to be indorsed by men who hold the power to say that they are fit to practice, and who do not have the ability to show that their claim is legitimate. I would be very sorry if this was the entire reach of the outlook of what we can do. We have almost ignored the foundation principles and accepted mere *ignis fatui*, mere flashes of light, that have not led us to the revelation of the truth by which to have a mastery of what we are doing. It is very well for us to speak of methods ; it is very well to speak of the materials that are used, and the obvious results, the surface expression of the result of the administration of any remedy, or the application of any method. But where in the paper have we any criterion by which to arrive at a satisfactory judgment as to whether we can conscientiously follow any one system? This brings me to the point that in the last analysis we must resolve ourselves to the old idea of teaching practically over the patient in our highest illumination. The serious obstacle in the way of the advancement of all organizations of professional men in societary arrangements is the assumption of finality in knowledge. There is no such thing outside of mathematics. The relations of numbers is the only certainty that the human mind has been vouchsafed the ability to comprehend and formulate so that every one that is able to grasp the proposition before them may say yea and amen. It is not the proper time to ventilate pet methods that are not the culmination of a large survey of all methods, for I would contradict myself if I assumed to have arrived at such a position except in part.

I was not pleased with the arrangement of the powers that be in saying that we should discuss the paper in our capacity as the assembled First District Dental Society and its guests before we heard what had been said where it had found its first pronouncement. Philadelphia claims to be the head center of medical science. We should not have been required to give our illumination and our intellectual apprehension of the paper without any indication of what the lead should be. We have no adequate lead as a whole, and each man must determine the lead which he will follow for the benefit of the patients that come into his hands. Sometimes I am almost abashed at the cheek with which we have assumed to operate in cases where we are absolutely unable to justify our procedure to any of our brethren. Let us then take each presentment of the truth as far as it is a demonstration, and reveal to each other how it impresses us as we make progress.

The president then called on Dr. Kirk to speak for Philadelphia.

Dr. E. C. Kirk. Mr. President and Gentlemen : I must thank Dr. Atkinson for the compliment that he has paid to the Philadelphia part of the profession, because I never believed that New York needed a lead in such matters. I supposed they always took it. If I understood Dr. Faught correctly, I think he takes the position that those who have written in the dental journals and those who have expressed themselves in dental meetings are to be taken as representing the profession. This I hardly think will be generally accepted. I mean that those men who have taken position as teachers do not represent all that is known of any given method ; therefore in my opinion the idea expressed in the paper does not represent the feeling of the profession at large. I am reminded of a friend of mine practicing in one of the Western cities who had the habit for years, in a spirit of truth-seeking, of asking the patients that came to him from the hands of other dentists, who had had the care of their teeth previously? He made a tabulated record of the information so obtained, and found that those who occupied public positions as teachers in dentistry, and those who talked in dental society meetings the most, were in the main the worst operators. In other words, that the best work done in the profession was done by the men who said the least about it. This may or may not be true. I simply state it as the result arrived at by this gentleman's statistics. I do not believe that we can by any means get down to any method of doing a given operation that will be regarded as a system to be universally used. On the question of the result that we want to arrive at, I think we are pretty nearly a unit ; but each man's method is largely his own, and when it comes to the question of method there is a point of individuality that can never be separated from the operation,—the *personal equation* cannot be divorced from methods employed. The question is, how can the operation be best done by the individual who has the matter in hand?

Dr. Ottolengui. Mr. President and Gentlemen : I was very much pleased with the paper, for one reason. I have been attending recently some meetings of medical societies and some meetings of the American Board of Health Association of Brooklyn. I was very much astonished to find that their methods of procedure in the presentment of facts are very different from ours in the dental profession. I find that the dentists, in teaching, generally assume to know, and do not back up their knowledge by any very material evidence, except in rare cases ; whereas in the other profession, of which some of you think we are a specialty, the method is quite otherwise. No man there makes a statement until he has investigated it thoroughly and experimented diligently, and is prepared to present some facts other than his own ideas. That the paper to-night has aroused, or attempted to arouse among us, a feeling similar to that, is a thing to be pleased with rather than criticised. The gentleman who read the paper has been told that what has been written upon any given method is no exposition of the practice of the dental profession at large. That may be true. But where else could he have sought for and gotten this information except from those who have talked as well as worked? If the men who do the best work do not write or speak about it, then they are derelict in their duty. They are the men who should be the teachers; they have no right to come to these meetings and learn what they can from the experience of men who tell them what they know, and then go home, and with their excellent skill improve on our methods, without coming back to share with us and tell us what they know. That is what I conceive to be the ultimate aim of dental societies: that the men who come to them should tell us what they know. If this suggestion to-night could be carried out so that men should be compelled, on a stated evening, to talk upon some given subject, and the discussion be tabulated, it would be an excellent thing; we could see what men were doing all over the country, and we might do the same here if it were found to be the best method. I am entirely in accord with that idea. I noticed one peculiarity of the paper: the gentleman had no axe to grind. He did not come here and tell us what he knows or what he does, and say we must do the same or we will be wrong. He simply pointed out the fact that the writers in the journals have not been adopting uniform methods, and have not brought their logic to bear on their work. I hope this will be the beginning of a new era with us. I believe this is a new era. I find an energy in dental societies this year that I have not seen before.

Dr. A. H. Brockway. Mr. President, I have no very definite ideas to express on the subject except that I think that altogether too much stress is laid upon particular methods of arriving at results. There is, as Dr. Kirk has justly said, always so much of the personal equation to be taken into account that it is impossible, it seems to me, to lay down any universal and accepted method of practice. What we want to get at is the result, and it does not matter, in my judgment, very much how that result is reached so that it be readily done. It is not surprising that so young a profession as ours should be in an unsettled condition as to methods of practice. We are mere children yet, and it is inevitable that while we are in this rapidly growing condition our ideas should lack the finality and precision which seems so desirable.

Dr. Benjamin Lord. Mr. President, the paper has interest in that it gives us facts, though facts are not always pleasant to hear. These facts, however, are not new to us; we have all known them—we might say always. Perhaps the discussion of the subject, or the state of things as presented, may awaken interest and do good—at least in some direction. I have often felt that it was unfortunate that there was not some standard or rule that would be generally accepted as the best to guide us in our manipulations. Yet there are probably many good reasons why we differ so much in our methods of operating. If we refer to the books and the schools, we find no uniformity in either. Then we not only use quite different instruments and appliances, every one using those that he likes the best, or has learned or trained himself to use, and believes that he can do the best with; but we have an almost endless variety of forms of gold and tin foils, which are put up for our use and are largely used. The use of these great varieties involves the use of different instruments and different methods of working.

I may say that I have felt that it was a misfortune and an embarrassment that there were so many different preparations of gold for our use, and also that there were so many different kinds of points for packing them. Further, I believe that these numerous varieties, both in instruments and forms of gold, are gotten up in the interests of the manufacturer rather than of the practitioner. Most of us are ever too ready to try new things, which is some evidence that we are not quite satisfied with the old, hoping to do better by using some things different from what we have been using. But here is often a great mistake, as the operations we make are intricate and must be exact, and we need to work on particular lines a long time in order to become expert or skilled. As has been remarked, results, ideal results, are what we are after. Of course we must be governed by the great principles that underlie all treatment and all operations, but it is very evident that we can do this and get the required results in very different ways or methods of working. Then again, every dentist is very much dependent upon his own individual experience and judgment. We do not, after all, get much from each other. The few who attend the clinics get some ideas. We tell at our meetings how we do things, but that is quite a different matter from showing and explaining the various progressive steps.

Quite a good deal was said in the paper in regard to the many different materials that are used for root-filling, showing a great variety of experience and judgment. There are so many different kinds of materials used, and such a difference of opinion as to their relative value, and so much uncertainty, owing to insurmountable difficulties in many cases in filling the canals with entire accuracy, that it would seem to be unimportant as to which material is used; and not infrequently the teeth do equally well when the roots are not filled at all. Of course very much more depends upon the condition of the teeth at the time of their treatment. I will say that I am using at present a paste composed of iodol one part, zinc oxide two parts, and carbolized cosmoline sufficient to make the paste of a proper consistency. It would indeed be most fortunate and valuable if this much-vexed question could be settled in a way that would be generally accepted as the best. Also it might be of great interest and value if some plan could be hit upon that would secure a good degree of uniformity in the various operations in dentistry. As regards plastics, we have too many of them; too great a variety; not a few of them quite unfit for use. The fact is that we know too little about that which we use until we try it. We trust the manufacturer, and he may be entirely wanting in the scientific knowledge required for such work.

Dr. S. G. Perry. I think a little horse sense, in the practice of dentistry, of more importance than anything else. I do not know that there can be any rules of practice set up. I do not know of any criterion that must be taken by one individual as the judgment of the profession. Here and there we know of a man who has what you might call horse sense, and we instinctively follow the lead of such men, and trust to their judgment when we distrust our own. I do not know that we shall ever get at what we call true data, or be able to formulate any reliable rules of practice. It must be always the result that we seek, and not the method of getting at it; although, if I were sitting in the chair to have an operation performed, I should prefer to have it gotten through with as easily and as quickly as possible, whether with a good result or poor. I sat in the chair only the other day to have one or two operations performed, and I thank Heaven most heartily that they were performed, because it gave me an opportunity to realize a little more fully than I had done what it is to be a patient in the chair, and how necessary it is for us to be as mindful as possible of all the little details that make for the comfort of our patients.

Dr. E. Parmly Brown. The lovely little paper we have listened to was full of statistics, but statistics must be thorough and true or they are worthless. When you talk of such statistics as furnishing an expression of the practice of the dental profession, let me tell you that not one out of ten of those who are capable of doing the best work and telling how it is done have stated their methods in the journals. Therefore, if you collect opinions of dentists from the journals you do not get reliable statistics. If you were to take everything that has been printed in the Cosmos since 1884,—and the essayist has not done that, for I could mention half a dozen filling-materials that he has not named,—if he had taken the expression of every gentleman in every dental meeting since 1884 he would not have had reliable statistics; for don't flatter yourselves that the dental profession attends dental meetings. Some of the finest operators in this country never enter a dental meeting. I am sorry for it. I try to get them to come, but they don't. Therefore, such statistics would not be satisfactory, even if the opinion of every man present in every dental meeting were recorded.

In regard to root-fillings, I wish I never had anything harder to do than capping nerves and filling nerve-canals. If that were all of dentistry I would think it an eternal vacation, and I would never stop practicing dentistry. It don't make any difference whether you drill out a nerve-canal or do not, nor whether you fill the canal with gutta-percha or with oxyphosphate. It does make a difference whether you take into consideration the condition of the patient and the condition of the teeth. I will venture to say I can give you one hundred different filling-materials that can be used successfully in filling nerve-canals, provided you put them in properly. But you must not seal up with them a lot of bugs, and make a bug-box above your filling. Nothing was said about what might be above your root-filling. The work is very simple if you go at it right. A little horse sense is a good thing; Dr. Perry was right about that. The most difficult part of dentistry is the manipulative part. That is the only thing that troubles me, the mechanical doing of the work; not the how to do it.

Dr. N. W. Kingsley. Gentlemen, while I feel very much pleased with the paper on several accounts,—first that it was short, and second that it was full of meat, and third that it was well delivered and right to the point,—I was a little disappointed that the regulations did not permit us to hear the discussion of the paper at Philadelphia before we were called out. I believe that we should now be permitted to hear the phonograph discussion of this paper in Philadelphia; it might provoke us into discussing not only the paper, but discussing them. One idea that occurred to me while the writer of the paper was delivering it was this: I have a great many times appeared before my profession in one way or another, and in a large number of instances I found myself in an unfortunate minority; but I do not think I ever found myself in so much of a minority by so large a majority as I have in that paper. He there collects statistics of root-filling materials from eighty operators, and only one of the number has spoken in favor of lead. Now the fact is that for more than thirty years I have been using more lead for root-filling than I have of all other substances put together. That was my one vote that he had in there. But, taking it on the ground that the best work is done by those who do the least talking about it, I still have an idea that lead root-filling stands at the head of the list.

The Phonograph Manager. Mr. President and gentlemen, I take a great deal of pleasure in introducing to you this evening the Edison phonograph, for the purpose of bringing to your ears the voices of some members of your profession who are now in Philadelphia. They are not with you, but their voices are here; I have them, after a manner, bottled up in a box. This instrument is capable of recording and reproducing any sound whatever that the human ear is capable of hearing; and when one stops to consider the fact that the lowest number of vibrations, or back and forward movements, that the human ear can hear is sixteen vibrations per second, and the greatest number that the human ear is capable of hearing is a little over forty-one thousand vibrations in a second,—when we stop to think that this instrument, after receiving those vibrations and engraving them on a material of a waxy nature, will afterwards reproduce them, I do not think there is anyone here who will hesitate to say that this is the most marvelous instrument that man has ever devised. This is the first time that the phonograph has ever been called upon to re-present to an audience a discussion among a body of gentlemen in another city. The time is coming when this instrument will be used for that purpose, instead of men writing their essays and having them delivered by some other person. In this case you get their voices, and there can be no mistake about what they have to say ; you hear them and it cannot be altered.

First, I will give you some illustrations of the capabilities of the phonograph, showing the various conditions and qualities of sounds that the instrument will record and reproduce. I am sorry that the time is limited and that I cannot give you an explanation of the instrument, which would be of interest to all, especially to those who are interested in scientific matters. I understand that at some future meeting that may be done ; but to-night, as the time is limited, I shall proceed to give you some illustrations of the working of the instrument that you see before you. This first record will explain itself.

(The phonograph here treated the audience to the well-known air, "When Gabriel Sounds his Trumpet in the Morning." Following this the airs of an orchestra were reproduced. Then came a plantation song, "'Way down in the Corn-Field," by a quartette of negro minstrels, in which was given an imitation of a passing steamboat blowing her whistle and ringing her bell.)

The Phonograph Manager. This is the first time that these gentlemen have ever spoken to the phonograph, and consequently some of their voices may be quite low and somewhat indistinct, while others may be loud enough to be quite audible. In case any are so low as to be inaudible to all of you, I have here an ear attachment to this instrument, by means of which fourteen persons may listen through stethoscope tubes and hear the record without any difficulty whatever. The reason that they are low is that sound increases in volume as to the square of the distance, and that instead of getting close and speaking into the tube and articulating clearly, some of the gentlemen spoke in a low tone and some little distance away from the instrument. In reproducing sound from the phonograph there is lost a great deal of the fine quality and tone, in consequence of that fine quality being due to delicate vibrations which are not reproduced loud enough for one to hear ; they are lost in the metal of the instrument.

Dr. C. A. Kingsbury. Mr. President and gentlemen, I congratulate you on the large attendance present, and the interest that has been inspired by the reading of the paper by Dr. Faught. I am happy to have the privilege of participating with you in the discussion of this evening. The paper in its character is quite unique. The author has touched upon many interesting facts, which certainly prove that there is a want of uniformity and established system in dental practice. What is regarded as correct practice with one, is looked upon as quite unsound and empirical by others. It is to be hoped, gentlemen, that this paper will inspire us with a determination to base our practice upon correct principles, and aid us in securing more uniform success in the treatment of difficult cases.

In regard to the filling of roots, there certainly is a very great difference ; some preferring one mode of treatment and some another. In regard to the different preparations of gold for filling teeth, we find that our practice differs to a very great extent, and there seems to be a strong tendency on the part of many in the profession to use cohesive gold to the exclusion of non-cohesive. I have been disposed to differ in my practice from my brethren in the profession to quite an extent ; I am satisfied from my observation that cohesive foils are used in many cases when non-cohesive would answer the intended purpose—*i.e.*, the preservation of the teeth—far better. For example, to-day I refilled two teeth that were formerly filled thirty years ago by a retired member of the profession in Philadelphia, with Abbey's No. 4 non-cohesive foil. These fillings had effectually preserved the right superior cuspid and lateral incisor, with the exception of slight defects around the edges of the fillings, and I considered it advisable to refill these teeth. This is only one example of numerous cases that we meet with, where non-cohesive foils have proved efficient in the preservation of teeth where the operations have been properly performed.

Dr. James Truman. I cannot agree with all the views expressed in the paper read this evening. Statistics are liable to errors of deduction. The essayist undertakes to prove by these that there is no certain mode of practice in the profession. When I recall the earlier periods of my professional career and remember the work devoted to root-filling by Dr. Maynard and others, I am convinced that the influence of this labor extended to all dentists who aimed to do work worthy of the name, and this became a settled practice. Root-filling has changed in character, but the principle remains precisely the same as it was thirty or forty years ago. What is the object of root-filling? It is to prevent, if I understand it, the septic poison of decomposition from becoming an irritant to the pericementum, to close up the canal so that it cannot be made a sewer of the decomposed organic matter. Now, if this be true, it is immaterial whether we use oxychloride of zinc or gold, the principle remaining the same all the way through.

There has, therefore, been a unity of opinion in regard to this one operation; and what is true of this special work is true, I think, of all the different operations. Arthur's introduction of cohesive foil modified every form of filling from the time it was introduced to the present moment. Individuals may, and necessarily will, differ in the use of materials.

The question of dentistry being a specialty of medicine is not, as I view it, of sufficient importance to discuss at this time. Personally, I am indifferent whether I belong to the medical profession or not, so long as I know I am part of the dental fraternity.

Mr. President and members of the First District Society of New York: Permit me to express the pleasure I feel in talking to you as a spirit. I regret exceedingly that my lack of familiarity with the medium makes my communication necessarily awkward and unsatisfactory, yet I trust that my limited control may add something to the interest of this meeting.

Dr. Joseph Head. Dr. Truman has justly said that root-fillings should of necessity exclude all moisture from the canal. The profession at large seems to have agreed upon this point; and excellent as Dr. Faught's paper was, he neglected to speak of what, in my opinion, will thoroughly exclude not only all moisture from the canal, but also all germs. Cotton, soaked in carbolized cosmoline, being highly antiseptic, when thoroughly packed in the canal will prove an effective bar to all moisture; and the cosmoline, moreover, can be readily forced to the apical foramen of almost any canal. Therefore, if the profession at large hold it as a truth that the perfect canal-filling is that which will exclude all moisture and kill all germs that may be present or may enter after the filling has been inserted, then, gentlemen, I hold it accepted that antiseptic cosmoline on cotton is the perfect root-filling.

Dr. S. H. Guilford. Mr. President and Gentlemen: The subject of the paper just read, as well as the lucid manner in which Dr. Faught has presented it, have been of interest to everyone present. Such papers are likely to bear good fruit. Most of us are apt to be content with opinions based upon a few apparent facts, but it is only through statistics (where they are attainable) that we can arrive at anything like a reasonable conclusion.

I am pleased to notice that there are differences of opinion on the part of the profession in regard to the treatment of diseases of the teeth, root-filling, and other matters. It is these differences and the discussion of them that bring us nearer to the truth. I should be sorry indeed to see the day when all of us would have a common opinion in regard to any of the subjects that interest us. If all men thought alike, there would no longer be any incentive to experiment and investigate; but so long as there is diversity of opinion, so long will new facts be brought to light and real progress be made.

In regard to the subject of root-filling, I think Dr. Head is in error in stating that the perfect root-filling had been found. So long as different men obtain equally good results by the employment of various materials and different methods, no one can justly claim that the ideal material has been discovered.

We want new theories, new materials, new methods, for we will be likely to find in each one some grain of truth or valuable quality not to be found in the others.

Dr. A. W. Deane. Mr. President and Gentlemen: I cannot fully agree with the able paper just read by Dr. Faught. It would seem that his argument tends to force all thought of the profession in the same channel. Now, I trust, sir, the day may never come when all dentists will think alike, for then there will be little or no progression, and it will be a sorry day indeed when there is no progress in the science of our profession.

With regard to the filling of roots, as an example, some five years ago I was thrown in contact with Dr. Henry Weston, of Weston metal fame. While in his office one day he called me to the chair and explained that he was about to remove an upper twelfth-year molar that was devitalized, and which he had treated and filled some fifteen years previous, packing the roots with cotton and wood creasote. He removed the tooth at this time to prepare the mouth for an upper denture. I broke it open, and found the cotton perfectly clean and having a very perceptible odor of creasote.

Whether this success was due to the careful treatment previous to packing the roots or to the creasote, I am unable to say; but I have never used anything but cotton and creasote after careful treatment. Many practitioners who do not use this medicament attain quite as good results. Thus it is unnecessary that we should all follow the same line of practice to attain the same result.

Dr. H. E. Roberts. I have listened to Dr. Faught's paper this evening with great pleasure, and I think there is a great deal in it to reflect upon. Dr. Guilford has said better than I can very much what I think. As long as dentistry remains a profession, there cannot be any one established rule for root-filling or any other operation which we have to perform. As soon as we decide on one definite plan, dentistry will cease to be a profession and become only a mechanical trade. In a profession where there are only two thoughts, and those two thoughts become one, I think it would cease to be a profession. In regard to root-filling, I think that no one rule should be laid down; I don't think it is possible to fill all roots with the same material. We will find, as long as we have different cases to deal with, that we will want to put different material into different teeth. We cannot do what we think would be best in all cases. I believe I have never filled a root with oxychloride since I had to remove one which I put in while I was a student at college, and I believe I shall never do so again as long as I can find any other filling which will answer my purpose.

Prof. Ernest Laplace. Mr. President and Gentlemen: Evidently the cause of such differences as are alluded to in the paper is the same as that which has for so long a time existed in the medical profession. Until lately both professions were empirical. In fact, dentistry has been much less so than medicine. It is only within the last few years that medicine has been based upon a scientific foundation. It is only since the immortal labors of Pasteur and Koch that the true causes of diseases have been found; and as the success attending their labors has manifested itself in the field of medicine, these results were gradually applied to the field of dentistry. We know it for a fact that various diseases are caused by micro-organisms, and that they can only be checked by the direct application of antiseptics to the parts. According as our knowledge in the right use of antiseptics increases, so will we find that the various methods heretofore used for the treatment of teeth will be modified. It may be possible that the reason why some forms of filling have been preferred to others by certain practitioners, while other forms have been preferred by others equally eminent, is simply that in some cases the tooth was properly disinfected and therefore ready to receive the filling, while in other cases it was not. Therefore the same filling was successful in some cases and unsuccessful in others. For that very same reason it has come to pass in the medical profession that affections formerly classified as different diseases are now known to be only different manifestations of the same disease and due to the same cause.

Dr. W. X. Sudduth. It would better please me to say nothing this evening, for it has been so explicitly pointed out that those who are the best workers are not talkers. But I am not in practice; I am left out entirely; but there is one phase of the question that we can speak on without being in actual practice; that is as to whether dentistry is a specialty of medicine or not. That is an open question, and I may be permitted one or two words on that point. No class of men can be a profession unless they deal with the principles that underlie their practice. If we depend upon only asking the *how* of the question, we are nothing more than a trade; but if we reach after the *why*, the principles that underlie the how, it matters very little what the how is: you get there just the same.

Dr. Faught. Mr. President and Gentlemen: I am delighted that it was my privilege to bring a paper before you that could provoke discussion.

There seem to have been one or two wrong impressions that I would like to correct. One is that I made sweeping assertions in the belief that they were literally true. One has to make sweeping assertions if he wishes to provoke discussion. The other wrong impression is that I assumed that my paper represented the profession. I distinctly said that it had only an inductive value ; and in the end of the paper I tried to show by statistics that but few of the profession had given voice to their beliefs ; and I also suggested a method by which I thought the opinions of the profession could be reached ; so that very fact showed that I did not think my paper was the expression of the profession on any particular subject.

In regard to the little query as to whether or not dentistry is a specialty of medicine, I must admit that I was astonished that it could be discussed or referred to by our friend Dr. Sudduth. In the November number, 1888, of the *Independent Practitioner* I published a letter under the head of Domestic Correspondence querying concerning certain things written as to what profession was meant. In speaking of the medical profession under the caption of "Dentistry a Specialty of Medicine," it was said, "We are *the* profession." I asked, "*What* profession?" That letter has stood now one year on record without a single word in reply. So I simply submit it as a thing that ought to have been answered long ago, if there is an answer to it.

Dr. W. H. Dwinelle. Mr. President, I think the phonograph has illuminated our minds through the discussion that has come over to us from Philadelphia. I am very much pleased with the paper that Dr. Faught has entertained us with to-night. I like his idea of presenting statistics and the tabulating of operations of different kinds. But I think he falls naturally into some errors in regard to the matter, and I find that my friend Truman is in harmony with me in many respects. The relative number of different operations in the several departments of our specialty has been recorded in a statistical form. I do not recollect the reported number of tooth-roots that were filled with gold, but I do remember that it is a very small number as compared with those filled with other materials. Now, according to my recollection, there was a time when for a great many years almost the only method of filling roots was what was called the Hudson and the Maynard method ; that was, filling roots with gold by means of Swedish broaches. I have practiced that method for over fifty years myself, and for most of that time exclusively. I know that Dr. Maynard used it exclusively, and does to-day. Dr. Hudson used it through all his professional life ; and so with hundreds, if not thousands, of others. I think the statistics are somewhat at fault. It is a subject that is worthy of discussion at another time.

The thanks of the society were extended to the essayist of the evening and to the visitors who participated in the discussion.

Dr. Campbell, of London, England, exhibited his new dental engine.

Adjourned. B. C. NASH, D.D.S.,
Secretary.

INTERNATIONAL DENTAL CONGRESS.

(Continued from vol. xxxi, p. 973.)

GEORGE CUNNINGHAM, D.M.D., L.D.S., Cambridge, England, read an interesting paper on "The Immediate Treatment of Abscessed or Pulpless Teeth."

By immediate treatment, the author means that method by which the roots of pulpless or abscessed teeth are treated and filled at one sitting; the object being to save time both to the patient and operator, while obtaining as good results. The author advocates the use of the nerve-drill as a sure and rapid means for modifying the aseptic conditions of the roots.

For some years past Dr. Cunningham has used this method on every patient who presented a pulpless tooth, without regard to the local or systemic condition of the patient. The result has been that the majority of teeth or roots for which extraction was the usual remedy are thus saved. His practice is as follows:

1. A free and direct access to the roots must be obtained as far as possible, excavating boldly the crown in the requisite direction.

2. To apply the rubber-dam in every case where its adjustment is possible.

3. To ream out the root-canals freely with engine nerve-drills as far towards the apex as safety will permit.

4. Where there is evidence of putrid dentine he makes every effort to remove it, but canals into which a broach cannot be passed are left unfilled. For the disinfection of the roots he uses a one per cent. solution of arsenious acid, or of mercuric chloride, in glycerine. Where the whole infected dentine is not excised he employs chloroform as an effective cleanser.

5. For filling the roots, he almost invariably uses oxychloride of zinc on shreds of cotton wrapped on a fine plain nerve-broach.

6. The crown he fills as desired, either with gold or amalgam. If only the roots remain, he defers the operation of crowning to a later yet not distant sitting.

From 1882 to 1887 the author treated one hundred and twenty-two cases of pulpless teeth by the "dressing method," which obliges the patient to come several times to the operator, and five hundred and twelve cases by the immediate method. Out of the one hundred and twenty-two first, thirty-six returned complaining of slight periostitis, thirty-two for swelling or abscess, six for extraction. Out of the five hundred and twelve, only three returned for slight periostitis, five for swelling or abscess, and three for extraction.

The author finds that when a moist condition of the pulp-canal contents is associated with pus formation, the pericementum is much more liable to be affected. Pericementitis is four times as frequent in cases where the pulp contents are moist as compared to those in which the contents are dry ; he also finds that root-canals containing dry contents are less liable to subsequent periostitis than moist roots. Out of sixty teeth treated, fifteen had been affected previously with pericementitis ; in twelve cases the local inflammation continued from one to ten days. In the forty-five remaining cases, which had not been inflamed previous to the operation, only four gave rise to pericementitis. Of these sixty teeth, in forty-one cases a permanent filling was at once inserted ; the others received a temporary filling on account of lack of time to do the permanent operation.

The last statistical table of the author gives his record of the immediate treatment of one hundred and fifteen cases of pulpless teeth. Out of these one hundred and fifteen, twenty-six had had a pericementitis previous to the operation ; eighty-nine had never been inflamed ; seven had a post-operative periosteal inflammation, and eighty-one permanent crown-fillings were inserted at the first and only sitting.

The following conclusions were arrived at by the author :

"Under the immediate method there were fewer extractions and failures. There were fewer subsequent attacks accompanied by swellings and acute abscess, and therefore the immediate treatment was attended with less pain. It requires also much less time, and is an immense saving to both the patient and operator, as the average time of treatment of such a tooth is considerably under one hour. One is enabled to save many more teeth which would otherwise be condemned.

"That the operative method, and not the medicine, is really the cause of the success. All such operations ought to be conducted with antiseptic precautions."

Dr. Oscar Amoedo, from Havana, read a paper on the "Treatment of Dead Teeth by Immediate Filling of the Roots."

He divides dead teeth into three classes : 1, those having only a partially dead pulp ; 2, those which have been for a long time devitalized ; 3, those with alveolar fistula.

1. For the treatment of a tooth in which part of the pulp is still

alive the rubber-dam is applied, the cavity is well cleansed and antiseptically washed with a tepid solution of $\frac{1}{1000}$ of permanganate of potassium; the cavity is then filled with gutta-percha, a small opening being left in communication with the pulp-chamber or pulp-canal, where a hypodermic needle can be introduced and one or two drops of a fifteen per cent. solution of cocaine forcibly injected; three or four minutes later the remaining part of the pulp can be extracted painlessly. The cavity is washed out with cold sterilized water, carbolic acid is passed into the roots, and they are filled with iodoformed chloro-percha.

2. In teeth in which the pulp has been dead for a long time, a large and direct communication must be established with the roots to be treated. The roots are then thoroughly cleansed with the ordinary broaches. The author recommends the use of nerve-canal drills to enlarge the pulp-canals. Care is necessary not to force any putrid matter through the apex.

When once enlarged, the canals must be washed with a solution of permanganate of potassium, carbolic acid, or peroxide of hydrogen, introduced into the roots with a very small canula capable of going as near the end of the root as possible. When the canals are clean they are touched with $\frac{1}{500}$ of bichloride of mercury, or with chloroform, or again with Dr. M. Evans's sterilizer. The filling of the canal is done, as in the preceding class, with iodoformed chloro-percha.

3. In the treatment of dead teeth with alveolar fistulæ, the tooth and root are well cleansed; the cavity is filled with gutta-percha, a small opening being left in the center to permit the canula of the syringe to approach the pulp-canals, and a tepid solution of permanganate of potassium is forcibly thrown through the root and fistulous opening. The canal is then thoroughly filled with shreds of cotton dipped in the following preparation: iodoform, Peruvian balsam, equal quantities; glycerine q. s. Soft wax is then placed in the cavity over this impregnated cotton, and thoroughly compressed, so that the preparation may be forced to pass out by the apex into the fistulous tract. The wax is then replaced by cement, and the gums are painted with concentrated tincture of iodine.

Out of a series of four hundred teeth the author claims to have lost only one tooth, and this was lost by an inflammation started by the removal of an amalgam filling; in another case, an abscess not healing, the author resorted to reimplantation.

P. Dubois, D.E.D.P., from Paris, read an article on the "Treatment of Teeth with Diseased Pulps or with Dead Pulp."

When the pulp is only slightly inflamed or has been recently exposed, the conservative treatment can give good results. If the exposure is of recent origin, such as an operative one, pulp-capping might preserve the pulp-organ in a perfect state. In cases of chronic pulpitis, capping does not prevent death of the pulp, but it renders it very slow, as is observed in teeth of old people or those where death of the pulp has occurred from external injury.

In most cases of exposure the destructive treatment of the pulp is the one recommended. The arsenical preparations are the best for this purpose ; this drug acting as an irritant and congestive and not as an escharotic. The pain produced by it can be lessened by the drugs which bring on a contraction of the arterioles, such as atropine, eserine, or cocaine. The first one the author thinks too dangerous, and prefers the last two ; creasote and morphia can also be added to the preparation with satisfaction. The preparations which diminish the pain also restrict the extent of devitalization.

The radical treatment requires the complete extirpation of the contents of the pulp-cavity ; the pain of the operation can be very much reduced by the repeated application of cocainized sulphuric acid. The extirpation must be followed by the perfect filling of the canals. The author recommends a method of his own as giving him great satisfaction : that is an aluminum wire dipped in a preparation of gutta-percha and black oxide of copper, introduced and left in the pulp-canal. The cavity, as well as the dressing used, must be rendered thoroughly aseptic. If we desire to succeed in the treatment of pulpless teeth, the occlusive filling is the only reliable one. Threads of cotton dipped into resinous tinctures do not satisfactorily protect the cavity from external infection. Except for the devitalization and extirpation of the pulp, caustic and strongly acid drugs must not be employed.

The treatment of dead teeth with or without inflammation in the neighborhood of the tooth, consists especially in the topical application of disinfectants and antiseptics. The mechanical or chemical disinfection of the cavity and canals permits us to combat the most inveterate cases of local disease around these teeth. The drugs which seem to be the best as dressings to be left in the cavity are the absorbents or volatile antiseptics, such as the mercurial preparations, in teeth where discoloration is not to be feared ; they must not be caustic, however.

An early filling of the teeth is always advantageous both to the patient and operator, and is superior to the immediate treatment of dead teeth, as well as to a too long treatment of the canals.

Extraction and reimplantation of the tooth is seldom advisable ; the treatment of the tooth *in situ* is nearly always possible. A tooth which cannot be treated through the dental canal is almost never fit to be reimplanted. Internal medication, the application of counter-irritants to the gums, or the production of an artificial issue for inflammatory products, are only to be mentioned as auxiliary to the local treatment of the tooth.

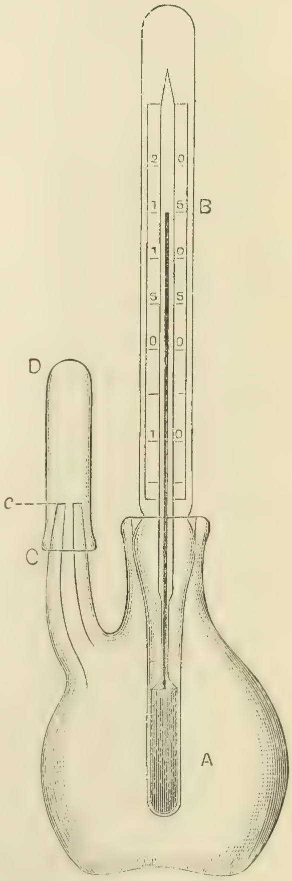
M. Dubois also presented a classification of the most important diseases of the mouth and teeth which are encountered. The author says that "as our special knowledge increases it becomes necessary for us to have a classification designating in a comprehensive and synthetic manner the phenomena which we encounter, grouping together those which are similar so as to facilitate the study and exchange of ideas on such subjects, creating a field of understanding for all those who work on the same scientific ground."

Unfortunately, the number of communications being very large and the time very limited, the congress did not discuss this important subject.

M. Grosheintz, from Paris, presented a plan of dental stenography or dental shorthand writing, with a view of establishing international symbols in dentistry.

Prof. Redard, M.D., from Geneva, Switzerland, read a paper on "Amalgam and the Mode of Testing its Retraction," which was illustrated by an apparatus of his construction.

The author drew attention to caries of the second degree,—that is, cavities which have involved only the dentine not reaching to the pulp, and said that poor operations in that class of cavities will surely lead to caries of the third degree, with exposure of the pulp. He uses almost exclusively amalgam and cement in his practice, and says that most of the failures observed with amalgam are due to a badly prepared alloy or badly compressed filling, which allows considerable retraction and leaves the door open to caries. To test the quality of a good amalgam, the author presented a little glass apparatus which he calls a pyknometer, which enables him to measure with certainty the diminution of volume of an amalgam in twenty-four hours. This instrument consists of a glass bottle containing about one ounce of liquid ; it has two tubular openings, a central and a lateral one. The central opening is closed with a glass stopper, which is at the same time a thermometer, the reservoir of which goes down into the bottle ;



the lateral tube is closed by a glass cap. The *modus operandi* of the test is as follows: The whole instrument or pyknometer, empty, is well dried and weighed and the weight noted. The thermometer stopper B is then removed, and the bottle is filled with distilled water at the temperature of 15° Cent.; the stopper is then replaced; the excess of water will escape by the lateral tube C, and one must be careful that the level of the water be exactly even with the opening of this lateral tube. The instrument is then carefully dried by the aid of bibulous paper, so that no dampness be left on the bottle. The little cap, D, is then replaced over the lateral tube, and the whole instrument weighed again and the weight noted.

Next prepare the amalgam of the consistence usually employed, and make a cylinder of it which will readily pass by the central opening, and weighing say two grammes.

The thermometer stopper, as well as the small cap of the lateral tube, are again removed, and the amalgam cylinder is introduced into the bottle. The thermometer is reapplied and also the cap of the lateral tube; the whole is again weighed, which gives the absolute weight, which is again noted. One hour later, again weigh the bottle, having previously filled with water the space in C caused by the retraction. This gives an increase of weight over the preceding, for a quantity of water has been added equal to the shrinkage of the amalgam. These weighings should be repeated after five, ten, and twenty-four hours, and the weights carefully noted, and when the two last weighings show the same weight the shrinkage has ceased.

All precautions must be taken, however, that during that time the temperature be always maintained at 15° Cent.

Arthur C. Hugenschmidt, M.D., D.D.S., from Paris, read a paper on "Implantation of Teeth."

The author, after alluding to the operations performed in America by Drs. Younger, of California; Kirk, of Philadelphia; Ottolengui and Curtis, of New York, gave a short account of his experience with the method, having had a series of seven cases with two failures, but remaining uncertain as to the permanent success of two other teeth. His method does not differ from the course usually pursued by operators in this line, except that the author allows the teeth which are to be implanted to remain for nearly one month in a solution of mercuric bichloride $\frac{1}{4000}$, the pulp-cavity having been well opened so that the antiseptic fluid might penetrate the tooth throughout; this to prevent all danger of infection.

As to the teeth employed, they were all dried, having been extracted many years ago, some over twenty-five years, and had been kept all that time in alcohol. Needless to say that the dental periosteum, if any was left, was not in a condition to be rejuvenated. Moreover, the soaking for a month in a bichloride solution was not favorable to the development of cellular life.

The author also recommends that the mouth should be placed and kept in a thoroughly clean and antiseptic condition for several days preceding the operation, by the use of antiseptic mouth-washes, such as boric acid, etc.

An important question is, whether the attachment is a vital or mechanical union or an anchylosis.

An osseous wound is made in absolutely normal tissue ; into this a thoroughly aseptic foreign body is introduced, which plays, of course, an absolutely passive part, and the cicatrizing process belongs exclusively to osseous tissue. A simple osteitis and accompanying anatomical changes take place ; the Haversian canals of the maxillary, which were opened in making the artificial alveolus, will have a tendency to increase by resorption of the osseous canals. Granulation-tissue rapidly fills up the empty spaces left here and there around or between the tooth and new alveolus. The root at this stage is surrounded by a tissue in an embryonic state. Soon, however, osseous materials are thrown from the extremities of the old bone and gradually replace this new tissue of inflammatory origin ; in this manner the tooth is gradually encircled by an exact adaptation of the new bone to it.

As to the remote result of the operation, certain implanted teeth will fall by resorption of their roots after one, two, or several years, while others will show no tendency to become detached, depending on the general health of the patient.

If we make one operation on a patient in a good state of health, the immediate result will be excellent ; if, however, this person be subjected occasionally to transitory interferences with general nutrition, such as from chronic malaria, any inflammatory tendency will be likely to show itself in a vulnerable part of the organism, such as where a foreign body has been introduced. The following case had come under Dr. Hugenschmidt's observation :

A physician forty-five years old, for whom one of the most eminent operators of New York implanted two superior bicuspids, the patient being in apparently perfect health. He saw the results of this beautiful operation in 1886, in Philadelphia. In 1887 the teeth were very firm and seemed likely to give many years' good service ; but during the winter of 1887–88 the gentleman had a most severe attack of frontal zona, which seriously injured his health. In the summer of 1888, when Dr. Hugenschmidt again saw him, the teeth were very loose, and a few months later they were taken out with the fingers. Microscopical examination showed the roots to be in an advanced stage of absorption.

If the operation be done on a person in whom ordinary accidents heal very rapidly, the inflammatory reaction occurring around the root will follow a normal physiological type. But the tooth, notwithstanding its aseptic condition, still remains a foreign body, and the organism will dispose of it as it does of all foreign bodies which penetrating into it do not give rise to severe inflammation : the foreign body or the tooth will be isolated, an osseous encystment will take place, or even an osseous sclerosis of the bone immediately in contact with the tooth ; this part will become more dense, more compact, on account of the disappearance of the organic matter, which will be replaced by the osseous substance ; there will be a condensing osteitis, and in that manner the tooth might be indefinitely retained in the maxillary, being isolated from the general system.

Prof. Redard, M.D., from Geneva, Switzerland, read a communication on the "Treatment of Caries of the Third Degree, or Exposed Pulps."

In caries of the third degree the pulp is exposed. It can be healthy or irritated, in a suppurating condition, destroyed in parts, or presenting some other pathological inflammatory state.

Conservative surgery must be applied in dental surgery as it is in general surgery, and will give equally good results. Lister's antiseptic and occlusive dressing should be used in our specialty. For the past seven years he had used no other method, and is much pleased with the results obtained. Arsenic and nerve-broaches have been banished from his office, so far as extirpation of nerves is concerned. He saves all pulps and portions of pulps, starting with the principle that the pulp is the nourishing organ of the tooth, and that without it the dental periosteum becomes most easily inflamed.

When caries of the third degree is met with, he first removes all the dentine with a proper excavator, taking care not to wound the pulp, then washes the cavity antiseptically, using ordinarily a $\frac{1}{10000}$ sublimated solution, to which $\frac{1}{500}$ resorcin is added ; this thorough washing out being finished, he makes a perfectly tight dressing, especially against the walls. The dressing is made with absorbent cotton, and the following resinous antiseptic tincture is applied :

℞ Corrosive sublimate, .02 centigramme ;
Ext. of opium, 50 centigrammes ;
Chloroform, 1 gramme ;
Resorcin, 1 gramme ;
Tinct. of benzoinum, very thick, 3 grammes.

Tincture of benzoin, when brought in contact with the saliva, precipitates in the meshes of the cotton and forms in that manner a perfect obturation for at least twenty-four or forty-eight hours. Whenever the dressing is renewed the parts must be washed with the bichloride solution.

After ten days, when all pain or odor have disappeared, he resorts to a temporary filling, which is left in place for a week at least. For this filling he proceeds as follows : A small pellet of cotton, iodoformed, is used as a cap to the pulp ; he then makes one occlusion with a dressing containing sandarac varnish, being very careful that the borders of the cavity be well packed. If no accident occurs he removes the first part of the filling, leaving the iodoform cap on the pulp ; he then places on it semi-fluid cement substance, and when this is somewhat hardened he finishes the cavity with the same preparation.

The author has had the opportunity to watch the results of his system in several instances, and has always found the pulp alive.

In regard to dead teeth or caries of the fourth degree, the antiseptic treatment will succeed only if the teeth have not had any periostitis, or if no necrosis of the apex of the root be present. Cleaning out of the canals the author does not think absolutely necessary ; but if this is done, the roots are to be enlarged with nerve-drills, and care is to be taken that no decomposed matter be pushed through the apex. The same antiseptics are used as in caries of the third degree,—namely, bichloride of mercury and iodoform.

The conclusions formulated by the author are, that—

1. All pulp or portion of pulp must be saved.
2. Arsenic must not be used except in very rare cases.
3. The nerve-broach must never be used for extirpating a pulp.
4. A well-understood antiseptic method is the base of the treatment of caries of the third and fourth degrees.
5. After a certain length of time, capped teeth can be permanently filled with a metal.
6. By the antiseptic treatment, cleansing of the canals of the tooth is not at all a necessity.

(To be continued.)

ODONTOLOGICAL SOCIETY OF CHICAGO.

At the annual meeting of the Odontological Society of Chicago, held November 19, 1889, the following officers were elected for the ensuing year : P. J. Kester, president ; Frank H. Gardiner, vice-president ; E. Noyes, secretary and treasurer ; Garrett Newkirk, curator ; George H. Cushing, member of Board of Censors.

E. Noyes, *Secretary*,
No. 65 Randolph street, Chicago, Ill.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.—SPECIAL NOTICE.

THE resignation and removal to Paris, France, of Dr. Junius E. Cravens, has made necessary the appointment of a secretary to fill this position. On the recommendation of the executive committee, I have appointed Dr. John S. Marshall, of Chicago. All communications requiring the attention of this organization should hereafter be sent to his address, corner Michigan avenue and Jackson street, Chicago, Ill.

JAMES TRUMAN, *President.*

PHILADELPHIA, November 25, 1889.

ANNIVERSARY MEETING OF THE FIRST DISTRICT DENTAL SOCIETY.

THE twenty-first anniversary meeting of the First District Dental Society of the State of New York will be held in the Grand Lodge room of the Masonic Temple, Twenty-third street and Sixth avenue, New York City, on January 14, 15, and 16, 1890, at 8 o'clock P.M.

PROGRAMME.

Prayer, Rev. Brady E. Backus, D.D., New York City.
Address of Welcome, Dr. A. L. Northrop, New York City.
Response, Dr. M. Whilldin Foster, Baltimore, Md.

PAPERS.

Dr. J. N. Crouse, Chicago, Ill.

Dr. Eugene S. Talbot, Chicago, Ill. Subject: "Fallacies of some of the Old Theories of Irregularities of the Teeth, with some Remarks on Diagnosis and Treatment."

Drs. Edwin T. Darby and Edward C. Kirk, Philadelphia, Pa. Joint paper. Subject: "The Manual Training Idea as a Factor in Dental Education."

Dr. George S. Allan, New York City. Subject: "Theory and Practice in the Treatment of Proximate Surfaces."

CLINICS.

Clinics will be given at the New York College of Dentistry, Twenty-third street and Second avenue, on the 15th and 16th, commencing at 9 A.M. sharp.

Dr. T. H. Parramore, Hampton, Va. Sterilized Sponge in capping Exposed Pulps.

Dr. George Eubank, Birmingham, Ala., will demonstrate the good qualities of Williams's Crystalloid Gold.

Dr. D. Sterra Arnold, Anniston, Ala. Antrum Drill.

Dr. T. S. Waters, Baltimore, Md. Crown- and Bridge-Work. Practical case.

Dr. Frank B. Darby, Elmira, N. Y. Appliance to prevent Mouth-Breathing.

Dr. F. T. Van Woert, Brooklyn, N. Y. Casting Gold for Tips and Crowns.

Dr. H. A. Parr, New York City. Plate Bridge and Crown combined (entirely new).

Dr. C. S. Stockton, Newark, N. J. Filling Teeth with Gold and Tin.

Dr. A. W. Harlan, Chicago, Ill. Experiments demonstrating the Action of Coagulants and Non-coagulants on Albumen; and an Illustration of a New Operation on Receded Gums, whether from Disease or Accident.

Dr. S. C. G. Watkins, Montclair, N. J. Soft and Cohesive Gold in combination, using Hand-pressure and Agate Burnishers.

Dr. T. D. Shumway, Plymouth, Mass. Matrix Filling.

Dr. J. Albert Kimball, New York City. Some Useful Devices, New and Old.

Dr. W. R. Clifton, Waco, Texas. Filling Incisor Teeth, Approximal Surface, with Williams's Soft Gold, using Hand Mallet himself.

Dr. M. A. Bland, Charlotte, N. C. Immediate Root-filling.

Dr. George W. McElhaney, Columbus, Ga. Tin and Gold Filling.

Dr. George H. Wells, Augusta, Ga. Tin and Gold Filling.

Dr. George H. Winkler, New York City. Soft and Cohesive Gold Filling.

Dr. H. H. Sisson, New York City. Sheathed Paper Disk-Carrier.

Dr. W. H. Dwinelle, New York City. Ancient and Modern Dentistry.

Dr. E. Parmly Brown, New York City, will Bake and Make Cases of Porcelain Bridge-Work, and will insert a Bridge if a favorable case presents itself.

Dr. R. Ottolengui, New York City. Gold Crowns without Dies.

Dr. George Evans, New York City. Gold Seamless Crowns; and will exhibit and demonstrate an Improved Form of Root-Dryer.

Dr. J. S. Campbell, London, England, will exhibit his new Pivotal Dental Engine, and a Model Laboratory with an Apparatus for using Compressed Air for Blowpipe; and give treatment of Teeth. Also a new Blowpipe designed especially for the treatment of Teeth.

Dr. J. N. Farrar, New York City. Appliances for correcting Irregularities of the Teeth.

Dr. E. P. Wright, Richmond, Va. Set of Engine Points (new).

Dr. Thomas T. Moore, Columbia, S. C. Contour Filling, using a combination of Non-cohesive and Cohesive Foil.

Dr. R. B. Adair, Gainesville, Ga. Filling Proximal Cavities, Bicuspids and Molars, with Amalgam Knuckling.

Dr. J. E. Register, Dover, Del. Combined Matrix.

Dr. C. A. Timme, New York City. New Furnace for Continuous-Gum Work, and for Gilding Artificial Teeth in Place of Gold Filling.

Dr. Calvin S. Case, Jackson, Mich., will demonstrate the method of making the Angle System of Regulating Implements and their Applications.

Dr. James A. Swasey, Chicago, Ill., will exhibit an Improved Suspension Engine.

Dr. W. B. Ames, Chicago, Ill. Illustrated Clinic. The Retention of Entire Dentures by Atmospheric Pressure.

Dr. George S. Allan, New York City. Hand Instruments for finishing Contour Fillings.

Dr. J. L. Gish, Jackson, Mich. Electricity in Pyorrhea; controlling the Current from Incandescent Light Circuits, through the Gish Ideal Rheostat; also operating the Electric Mallet, Cautery, Mouth-Lamp, etc., from the same source.

Dr. F. E. Howard, Buffalo, N. Y. New Method of Adaptation of Gold to Cavities in Filling Teeth.

Dr. G. L. Curtis, Philadelphia, Pa. (assistant to Prof. James E. Garretson). Oral Surgery: Resecting the Inferior Dental Nerve.

Dr. A. H. Stoddard, Boston, Mass., will exhibit an Improved Gas Furnace, and demonstrate its use in Baking Porcelain.

Dr. J. E. Waitt, Boston, Mass., will present his rapid method of Inserting and Finishing Contour Gold Fillings without the aid of a Matrix; also a new Ether Inhaler, Nitrous Oxide Light, and his method of making Mouth Mirrors.

Dr. A. Retter, Utica, N. Y., will demonstrate his method of making Bridge-Work, showing how he Bands the Teeth, and how he Backs Continuous-Gum, at the same time protecting it with Gold.

Dr. F. W. Gibbs, Brooklyn, N. Y. Gold Crown and Plate combined.

Dr. E. V. McLeod, New Bedford, Mass. Combination Filling,—Robinson's Fibrous Foil and Gold,—making Chemical Union.

Dr. E. T. Starr, Philadelphia, Pa. Electrical Appliances, etc.

For further particulars apply to Dr. A. L. Northrop, president, 57 W. Forty-ninth street, or to Dr. W. W. Walker, chairman of the executive committee, 67 W. Ninth street, New York City.

EDITORIAL.

ANOTHER RÉSUMÉ.

At the meeting of the American Dental Association held at Saratoga in August last, Dr. Louis Jack, of this city, read a paper entitled "The Necessity for Independent Dental Journalism," which was published in full in our issue for November. The paper contained grave but indefinite charges of discreditable motives and unworthy actions, which, as no exceptions were made, implicated every commercial house which publishes a dental periodical, as well as all the editors of such periodicals. In an editorial criticism of the paper we urged that the charges should be made specific, and tendered the pages of the Dental Cosmos to Dr. Jack, inviting him to justify the several utterances which we had quoted.

If the charges were true, Dr. Jack owed it to the profession to substantiate them when opportunity and invitation coincided. If they were not true, he owed it to his manhood to withdraw them.

We extended the invitation to Dr. Jack to reply to our criticism through the Dental Cosmos because we felt sure of our position,—sure that he could not produce evidence of the truth of the charges so recklessly made. The result is shown in his reply, which we present in this number.

It is hard to imagine how a self-respecting man could have asked or expected the publication of such a tirade by the very parties aimed at. A more pitiful evasion of an issue, a more unblushing begging of a question, it would be difficult to frame. As an explanation which does not explain, a justification which does not justify, it is a brilliant example. He has abused the opportunity we offered him, and instead of squarely meeting the issue has failed to rise above a repetition of innuendoes,—oblique intimations of what he could tell if he chose to do so. Witness the following. Dr. Jack says,—

> "There is enough evidence not only to prove all the allegations contained in the address before the American Dental Association, but more than is required to bring 'a plague upon their houses.'"

Suppose we should say, "There is enough evidence not only to convict Dr. Jack of gross immoralities, but more than is required to bring a plague upon his house." Would he not be justified in saying, "Such an unsustained defamation is as contemptible as it is impotent"? And if he did so reply, what answer could we make in order to escape the condemnation of all right-minded men?

Again, Dr. Jack, alluding to our mention of other gentlemen who are editing dental journals published by commercial houses, says,—

> "Those he alludes to are men who have been legitimately instructed in dentistry and in medicine, who have worn their garments on college benches, and have been 'sweated' in the faculty-room."

This paragraph is destitute of meaning unless it were intended that the inference should be drawn that the editor of the DENTAL COSMOS had not legitimately received his degrees. A statement of facts is therefore permissible which under other circumstances would appear egotistical. The D.D.S. degree was conferred on the writer in 1872 by the Pennsylvania College of Dental Surgery, because of his contributions to dental literature; and the degree of M.D. by the University of Pennsylvania after regular matriculation, two years' attendance upon lectures, and an examination by the faculty, which by vote named him as one of five, out of a class of one hundred and eight, who were deemed worthy of public honorable mention at the commencement exercises. We regret the necessity for such personal statement, but must, to quote Dr. Jack, "fight the devil with fire."

Referring further to the gentlemen named who are in editorial charge of other journals, Dr. Jack says,—

> "They have also been and are now engaged in actual practice, and for these reasons they have been more in touch with their profession and are more truly entitled to be respected and to represent dentistry," etc.

Granting that, other things being equal, one engaged in actual practice may possess certain advantages over one not so occupied, we fail to see how this argument applies to the journal whose interests Dr. Jack represents. The editor of that journal is not engaged in the practice of dentistry, nor in any specialty of medicine, although until recently classing himself as a specialist in genito-urinary and rectal diseases.

Dr. Jack complains that we employed ridicule and sarcasm in our comments on his paper; that we apparently purposely misquoted his language and perverted his meaning. We did employ ridicule and sarcasm, because they were the appropriate weapons with which to meet his ridiculous assumptions.

As to the misquotations and perversions with which he charges us, a reference to his paper and our comments in the November issue of the Cosmos will show not only the falsity of the charge, but will also show Dr. Jack's attempt to justify it by the introduction of new matter, in quotation-marks as though taken from his previous paper, but which did not appear there.

Dr. Jack, both in his Saratoga paper and in his later effusion, complains of the want of editorial discussion of "questions concerning us," of "silence and the weaker-than-water counsel when clear, forcible, and true opinions are needed." In the light of this complaint we simply copy, without other comment than the statement that the criticism was of his own paper, the following specimen of his consistency:

> "Is not the assumption of authority exhibited in his editorial criticism of a paper forming a part of the proceedings of the American Association a dictation bordering on actual usurpation?"

In Dr. Jack's Saratoga paper there was a general indictment of all dental journals published by commercial houses. It was "these journals" which had "usurped," "stifled," "tried to create false ideas," "checked the efforts of dentists to organize," "shown an evil nature," "encouraged dangerous opponents to professional interests." It was "they," "their," "these" throughout,—always in the plural: "these persons," "their pretensions," "their business interests," what "they" had and had not done, what "they" could and could not do. The inference was necessitated that all journals published by "persons engaged in commercial pursuits" and all editors of such journals were included in the condemnation. We asked naturally if Dr. Jack meant to include Drs. Taft, Gorgas, Watt, Harlan, Patterson, and other professional men who edit journals published by commercial houses. Dr. Jack replies, "The attempt upon the part of the editor of the Cosmos to associate with himself those who have acted simply in an editorial capacity was an ingenious one." This retort is neither ingenious nor ingenuous. We do not know of a single dental periodical in this country, except the Dental Cosmos and the *International Dental Journal*, which is not edited either by one of the gentlemen named or by some other practitioner. These being *ex*cluded by Dr. Jack's protest against their *in*clusion, the problem is who were "they," "these," and "their"? Did Dr. Jack consider the Dental Cosmos such a host in itself as to necessitate the employment of plural pronouns to indicate it? His repudiation of the suggestion that journals edited by those who "really are of us" were implicated compels the conclusion that the "they," "these," and "their" referred exclusively to the DENTAL COSMOS, as we believed they did.

It is all very well for Dr. Jack to stand on assumed dignity and decline to "descend to personal controversy with the editor of the DENTAL COSMOS." He says truly that "the consideration of public abuses is not usually approached by arraigning individuals"; but unfortunately he fell into the sad blunder of doing that very thing in his Saratoga paper, though lacking the courage to express openly what it was evident he meant should be inferred. In his later effort he exhibits still more plainly and still more offensively the animus actuating him.

Several of the allegations of the Saratoga paper are serious; one of them especially is calculated, if not intended, to damage the business of the company publisher of the DENTAL COSMOS, and to create false and unjust opinions concerning the publisher and editor of this journal. Gentlemen do not usually bring charges injuriously affecting the reputation of others without being prepared to substantiate them. We therefore propose that Dr. Jack disclaim the apparent limitation of his language to the DENTAL COSMOS, or boldly admit that it was the object of his attack. If he will say that he has specific reference to the DENTAL COSMOS, to its editor or publisher, and charge it, them, or either of them with having "used *their* influence and the power of *their* agents to check the efforts of dentists to organize for the purpose of defending themselves," etc., we will give him the opportunity to justify himself by the production of that "evidence enough" of which he claims to be possessed in a defense in open court. If he, to quote his own stilted phraseology, "can stand in the clear light of heaven and say that he has not lied, he will have no need to make any grimaces, will not run upon a sword or be pierced by the logic of facts."

We dare him to the issue.

CO-ORDINATION.

As there should be no antagonism between labor and capital, so there should be none between the inventor, the manufacturer or the tradesman, and the professional man. The industrial system of the world is as essential to science as science is to it. The college and the forge, the scholar and the artisan, the office and the workshop,—the ideal and the practical,—are not antagonistic but co-ordinate, and must harmonize for the production of the conditions which make noble art a possibility. All that inventive skill can devise or careful study suggest is needed by advancing science and contributes to the mastery of the problems which it aims to solve. The perfection of the industrial ideal is essential to the perfection of the professional ideal.

CHAPIN A. HARRIS MEMORIAL ASSOCIATION.

THE alumni of the Baltimore College of Dental Surgery have resolved to signalize the semi-centennial of that institution by the erection of a memorial building to its founder, Dr. Chapin A. Harris. To this end a memorial association has been organized,—Dr. W. W. Walker, president; Dr. B. Holly Smith, secretary. The college faculty has subscribed six thousand dollars as a nucleus, and an appeal is made to the graduates of the school to assist in the enterprise.

BIBLIOGRAPHICAL.

DIE MIKROORGANISMEN DER MUNDHÖLE. Von W. D. MILLER, Dr. med. et phil.; Professor am zahnärztlichen Institute der Universität Berlin. Leipzig, 1889.

This work by Prof. Miller on the Micro-organisms of the Oral Cavity has been looked forward to with much interest, as it was generally understood that it would comprise the entire labor of the past ten years of his life, with the addition of more recent investigations. That this has been entirely fulfilled must be clear to anyone giving it a careful examination. It is not a mere résumé of past work; but, while it is all this, it is more, in that every page indicates the master capable of imparting new light to old subjects and revivifying even his own work by more recent and valuable contributions.

He says in his Preface, "It has been my effort, in the first place, to fill up a very noticeable gap in the literature of dentistry. I hope also that I have in the chapter on the pathological effects of the mouth fungi afforded interesting material to the practical dentist.

"In order that many readers not actively engaged in bacteriological studies may have these facilitated by a comprehension of the action of the mouth fungi in causing fermentative and diseased processes, I have made, in advance, a possibly short explanation on the morphology of the life condition and expression of the fungi, and have also given explanations in relation to the nature of the fluids of the mouth and of the organized material of the oral cavity which serve as nourishment for the fungi."

Chapter I is devoted to a "Short Outline of the Morphology and Biology of the Inferior Fungi."

This "short outline," as it is designated by the author, covers thirty-one pages of most interesting material, and will clear up to many minds this whole question and explain to the comprehension of those not very familiar with the subject the morphology of the various fungi as, perhaps, never before.

In Chapter III the author endeavors to remove the impression that investigations in this direction must necessarily be attended with great cost to the individual. He says, "For commencing the study, only very few and not costly apparatus will be required:

"1. A microscope (Zeiss, Leitz, Hartnack, Seibert, etc.). If a cheap instrument be desired, it is better to procure a good stand, two lenses of low power, with necessary eye-pieces, and an amplifying power from 20–300. These serve for the beginning, and an extended study of the mouth fungi can be satisfactorily made. If the development of these, together with their morphology, be required, it will necessitate an oil immersion lens. This can be procured subsequently; price, 100–500 marks ($25 to $125). 2. Some moist-chambers (2–4), which may be improvised out of soup-plates. 3. Six small glass dishes and some watch-glasses. 4. Twelve glass plates and supports. 5. Object-holder and cover-glasses. 6. Two platinum needles. 7. A drying-chest. 8. Shears, pliers. 9. Reagent glasses. 10. Coloring material, oil of cloves, alcohol.

"A breeding-oven and a freezing microtome will be necessary for more extended investigations." . . .

Then follow the various questions that will naturally arise in the investigation of the morphology and development of fungi, and these are clearly answered. The biological studies of the various fungi will be found one of the most interesting chapters in the book, and the illustrations so well describe these that nothing seems to be wanting to make the subject entirely clear to those not familiar with microscopic work. It will, therefore, be invaluable to those who have not time for more extended study in this direction and yet wish to be fully informed as to the character of the fungi of the oral cavity.

Chapter IV, "On the Mouth Fungi as Fermentation Producers," contains much that is of great value and covers to a considerable extent Prof. Miller's original investigations. Under the head of "The Effect of the Mouth Fungi upon Carbo-hydrates," he remarks, "Of the very greatest interest for the dentist is the effect of the fungi upon carbohydrates, since upon this depends the development of caries with its serious results. Of the previously-mentioned 22 mouth fungi, 16 soon exhibited an acid reaction, if developed in a meat extract—pepton—sugar solution; 4 generated, under similar conditions, an alkaline reaction, and with 2 only the reaction remained neutral.

"In a later series of investigations upon the reaction in sugar solutions with 25 mouth, 13 stomach, and 14 intestinal fungi, the result was as follows: From the mouth fungi investigated 16 gave an acid reaction, 4 alkaline, and in 5 the result was not constant. With the stomach fungi the corresponding numbers were 9, 2, 2, and in case of the intestinal, 6, 5, 3. The number of the acid-producing fungi in the mouth and stomach was proportionately greater than in the intestines. Whether these proportions are maintained can only be determined by an extended series of investigations. . . .

"The determination of the acid was effected through analysis and partly through examination of crystallizations, and also partly by the color reaction recommended by Ewald."

On page 125 the author discusses the much-disputed subject of the transparency of dentine. This has always been of great histological interest since Tomes first gave it form in his "Dental Physiology and Surgery."

Prof. Miller says, in regard to the investigations of Walkhoff, that he, Walkhoff, concludes from his observations that the transparency must be regarded as a sclerotic activity at the sacrifice of the dentinal fibers. The true nature is an increased and continued physiological activity, which produces an over-production of intercellular substance at the expense of the cells, beginning with their prolongations.

He further observes, "From the observations which I have made in reference to the transparency, I am forced to believe in the Walkhoff theory. In my judgment the choice must lie between two possibilities,—the loss of lime-salts in the basis-substance, which is capable of producing a kind of transparency, and the partial or complete filling of the tubuli with a substance which approximates the same phenomena in relation to light, as the intertubular substance.

"Loss of lime-salts has certainly not taken place in the transparency in question, this being sufficiently shown in chemical analysis; many facts, on the contrary, favor the Walkhoff theory of calcination.

"1. We know that in the normal condition the diameter of the dentinal tubes is much greater near the pulp than at the border of the enamel; that in senile dentine they are considerably narrower than in youth. These facts point to a gradual diminution of the diameter of the canals after the formation of the dentine is completed. Further, we know that chronic stimulation, of all kinds, tends to the production of secondary dentine on the inner surface of that tissue. Why not, then, a more rapid formation of dentine in the region of the fibrillæ?

"2. Microscopic investigation shows in the transparency a narrowing of the diameter of the tubuli. This indicates, at the same time, a reduction in size of the fibrillæ.

"3. The transparency is characteristic of living dentine.

"4. Chemical analysis gives results in unison with this theory. Dentine from the transparent part of a number of teeth (25) and dried at 102–105° C. gave 71.9 per cent. of ash, while normal dentine from the same teeth gave 72.1 per cent.

"A second trial made by a chemist resulted, for the transparent dentine 69.5 and for the normal from the same teeth 68.0. The small quantity of ashes leads to the supposition that the dentine was not satisfactorily dried before the burning. This last trial is, therefore, not wholly to be relied upon; but it shows, notwithstanding, that in the case of transparent dentine we have rather an increase than a decrease of lime contents.

"The general impression that this theory coincides only with an increase of lime deposit is not quite correct, for a new formation of dentine, whether on the periphery of the pulp or in the region of the dentinal fibrillæ, does not take place without a previous thickening of the outer odontoblastic layer or that of the fibrillæ.

"If, therefore, a new formation of intertubular dentine takes place at the expense of the dentinal fibrillæ, it determines not only an augmentation of lime-salts, but also a similar increase of the lime-giving basis-substance.

"Finally, this theory cannot be confounded with the older calcination theory, the latter requiring only an impregnation of the fibrillæ with lime-salts, while this necessitates a partial or complete change of the fibrillæ into normal dentine."

It may not be inappropriate to suggest that the author might clear up in the English translation this portion to advantage. There seems an apparent inconsistency in some of the statements made.

In the chapter on "Prophylaxis of Caries of the Teeth" he writes: "An agent which only inhibits the development of these (fungi) so long as it remains in contact is absolutely worthless. The increase of the fungi does indeed cease for a minute; but during the other fourteen hundred and thirty-nine minutes of the day it proceeds undisturbed."

This may be questioned, as there is probably no proof that injurious action of the fungi is immediate, and, therefore, as time is required for the effect of their waste products, an inhibiting agent, though of limited power, must beyond question have a more lasting effect than $\frac{1}{1439}$ of the twenty-four hours. It is, unfortunately, too much the custom of some investigators to decry clinical experience, and while our author does not do this, his influence seems to bear in this direction. Clinical observations are as important as microscopical; indeed, these correlate with each other as the positive and negative of all investigations. In the traumatic pathological conditions of the oral cavity it is clearly shown that irritating results are not apparent to sensation under forty-eight hours. If this be true, the weaker antiseptics may have a value not given them by the author. To inhibit for a minute may mean a retardation of the destructive action for hours. Aside from this, these weak agents have the merit of being safer in the hands of the careless and ignorant.

The Second Part, "The Pathogenic Fungi of the Mouth," is full of interest and of vital importance. He says,—

"During these studies I have discovered in the mouth a number of bacteria having more or less pathogenic effects. I have closely investigated four. To these I have given the following names:

"Micrococcus gingivæ pyogenes.

"Bacterium gingivæ pyogenes.

"Bacillus dentalis viridans.

"Bacillus pulpæ pyogenes.

"1. *Micrococcus gingivæ pyogenes.* This fungus I found three times in a case of pyorrhea alveolaris in intervals of three months, once in an unclean but otherwise healthy mouth. The fungi appeared as irregular cocci, or very pudgy rods, single or in pairs. They grew very fast on gelatine plate culture at the temperature of the room, and formed round colonies with sharp contour. At the beginning they presented, under the microscope, only slight color; later they became very dark, particularly if widely separated from each other. Stroke-culture upon agar-agar exhibits a moderately strong growth of a green color, which by transmitted light is given a violet tone.

"Under the microscope the stroke appears as a homogeneous, nearly colorless matrix, which is impregnated by variously-shaped irregular dark figures. The gelatine is not liquefied. Cultures in meat extract—pepton—sugar solution give a strong acid reaction, and a considerable amount of gas is developed.

"Subcutaneous inoculation of mice produced abscesses and destruction of the skin, and in some cases resulted in the death of the animal.

"*Bacterium gingivæ pyogenes* . . . appears in the form of thick, short bacteria, with rounded ends. Their longitudinal measure is 1½–4 times the transverse diameter. In plate-cultures growing quickly at the temperature of the room the colonies oftentimes are visible with the unassisted eye after more than twenty-four hours. Under the microscope they appear as perfectly round, yellowish colonies, with sharp borders. The gelatine will quickly liquefy, so that after forty-eight hours the first dilution is thoroughly liquefied.

"Stroke-cultures upon gelatine present in fifteen hours a 1½ m.m. trough of liquefied gelatine, the side of the trough being clouded and the floor covered with a white deposit. Stroke-cultures upon agar-agar exhibit a thick, moist grayish-white growth, which appears under the microscope colorless at the border and brown at the middle. They show also a filamentous structure.

"*Bacillus pulpæ pyogenes.* . . . They grow with considerable rapidity in plate-cultures, the colonies appearing large and round and of a dark brown yellow with sharp contour, and upon gelatine begin to liquefy in eighteen to twenty-four hours. Up to this time they appear as greenish, bright lines of upwards of 1 m.m. in width, the surface projecting over the level of the gelatine."

The following paragraphs are of vital importance to those who have failed to appreciate the effect resulting from a wounded surface. The amount of injury done by various instruments used in entire disregard of possible consequences is clearly set forth.

"Many facts go to demonstrate that an important number of pathogenic micro-organisms are able to thrive in the fluids of the mouth, so long as the mucous membrane remains intact, without it being possible to separate their life characteristics from the usual parasites of the oral cavity. If, however, a wound of the soft parts takes place, as in the extraction of teeth, or if there is a decline in the powers of resistance of the mucous membrane, fungi will find an entrance and be able to give indications of their specific effects. In this manner, it is highly probable, many of the reported cases of death from infection should be ascribed to dental operations which formerly have been charged to an infected tooth forceps.

"Each extraction, not made under antiseptic conditions, can be regarded as an inoculating experiment, which, unfortunately, is very often attended with the most favorable results. The extensive wounding of the soft parts and of the bone in severe extractions gives a convenient entrance to the bacteria. He that has once seen an unclean mouth with the mutilated teeth, the red gum, the thick, greasy coating frequently covering entirely single teeth, will not wonder at the frequent occurrence of inflammation, swelling, suppuration, necrosis, caries of bone, and even septicemia and pyemia, after dental operations, and will not, without further reason, blame the dentist for having had an 'infected instrument.'"

Then follows a series of instructive cases, covering ten pages illustrative of and enforcing this position. They demonstrate the importance of careful disinfection after all operations. The carelessness of the average operator in the use of ligatures, clamps, etc., should find a corrective in these facts, as they bear directly upon this indifference to results of a more or less serious character.

Passing over much worthy of translation, the reader comes to that portion devoted to the consideration of pyorrhea alveolaris ; and while this is a very trite subject, the author has, in his usual way, invested it with an interest from his own original investigations and also by quotations, one of which is given.

This is "a disease of the oral cavity which, next to caries, has been the occasion of more discussion than all other diseases of the mouth, and which every dentist in practice frequently meets with.''

Then follows a list of names which have been attached to this disease, sufficient, one would think, to satisfy the most exact critic of our defective nomenclature, and which might even lead an Arkövy to call a halt in the multiplication of technicalities. It has been called ''Riggs's disease, pyorrhea alveolaris, loculosis, blennorrhea gingivæ, periostitis alveolo-dentalis, infectiöse arthro-dentäre gingivitis, phagedenic pericementitis, expulsive gingivitis, symptomatische alveoläre arthritis, etc.'' . . .

The following quotation which the author makes from the investigations of Galippe and Malassez is so satisfactory, in many respects, that its insertion here is not out of place :

''Galippe discovered in the tubuli in teeth affected with infectiosen-arthro-dentären gingivitis a parasite designated by the letter η, which had the form of a small double bubble and which by culture changed into a rod when the jelly liquefied, and in the gelatinous bladder a characteristic pencil was formed. Under the skin of an infected guinea-pig it produced, after fifteen days, in the region of the joints of the anterior and posterior claws, a series of abscesses which prevented movement of the animal, and the pelvic movements connected with it were very painful. Some of the abscesses opened spontaneously. The others were opened with caution. The parasite η could be isolated from the pus collected. After the guinea-pig had lived for several months it was restored to health, but retained a heaviness and stiffness in the region of the joints.

''In the case of the rabbit into which we had injected a pure culture of η under the skin of the abdomen, we discovered that these parasites had a predilection for the bone-system. At the expiration of fifteen days the rabbit was considerably reduced and showed a difficulty of locomotion, and we established the existence of an abscess in the left leg. This was opened, and out of the pus collected and properly manipulated a pure culture of the parasite η could be developed. After the lapse of some days the abscess appeared again, the animal breathing with difficulty. Weakness and dejection followed, and in about a month after the inoculation the animal was killed. The examination of the heart and lungs resulted in nothing peculiar. The kidneys were healthy. The injection had in no way produced inflammatory reaction, neither in the organs of digestion nor upon the skin of the abdominal cavity. The liver was the seat of an enormous abscess which filled its entire posterior surface. The lower surface of the thighs exhibited numerous abscesses. In opening them it was possible to establish the existence of a fracture of the lower extremity of the femur at the distance of one centimeter from the surface of the joint.

"At the circumference of the fracture the bone was attacked, and the plane of fracture was in connection with the neighboring abscesses. In contiguity with the diseased tissue were presented a series of abscesses from hazel to walnut size. The joint appeared to be healthy, as far as could be judged. The piece was kept in alcohol. In the region of the ribs abscesses were found which ranged remarkably to the side of the pleural cavity. The subcutaneous abscesses were less developed. If the ribs were cut longitudinally in the plane of the abscess, the bone was found swollen and greatly softened, as though by a peculiar form of osteitis. Upon other ribs were seen fractures in the plane of the abscess, which communicated with neighboring abscesses.

"According to the views of my teacher and friend, Malassez, who undertook an investigation of these lesions, it was a case of osteitis, which produced the fracture of the bone and the abscesses. This is the only possible explanation of the fracture observed in the femur. . . .

"The direct inoculation of the parasites η and β between the teeth and gum of the animal gave undecided, if not negative, results. The infectiöse arthro-dentäre gingivitis is, says Galippe, certainly not a local disease."

Miller observes in regard to these investigations of Galippe that they "are without doubt the most thorough and careful which have been made up to the present time," though he does not agree with him in all his conclusions.

The author's own investigations in pyorrhea alveolaris are of a somewhat extended character.

"Since the year 1885 I have investigated the existence of bacteria in pus and on the roots of teeth in thirty-nine cases of pyorrhea alveolaris in men and six cases in dogs. . . .

"Of twenty-seven teeth affected with this disease, I prepared plate- and stroke-cultures of meat—water—pepton gelatine. In two cases no growth was exhibited, in one a stunted growth. In the other twenty-four cases twelve exhibited a very quick growth, five medium and seven poor growth. In five cases only was the gelatine liquefied. Once only the staphylococcus pyogenes aureus was developed, and once the staphylococcus pyogenes albus.

"Two formed a yellow-colored material, and one a green. The last is so far of interest in that the formation of the colored material is completely delayed by limitation of air. Agitation of the liquid, colorless gelatine with air, produces immediately a beautiful deep green color. . . .

"The conclusion I have drawn from this investigation is, that if this is a specific fungus for pyorrhea alveolaris, it is not readily grown upon gelatine, which is of this much value, that it proves that future investigations must be made with other nourishment. The thought arises that possibly the fungus of pyorrhea alveolaris, as in the case of many mouth fungi, cannot be developed upon an artificial soil, in which case all investigations are in vain." . . .

This is followed by reports of cultures from men and dogs; but space will not permit further extracts, and the author's view as to the combined causes of this pathological condition will be briefly given:

"My view is that three factors must be taken into consideration in each case of pyorrhea alveolaris: 1, predisposition; 2, local irritation; 3, fungi.

"A prominent factor in predisposition is rachitis. Of twenty-six cases of children under twelve years, seven had symptoms of pyorrhea.

"Dr. Fröhner, professor of the Veterinary High School of Berlin, informed me that dogs fed with potatoes, meal food, or sugar are peculiarly liable to this disease, and this is found in combination with skin-trouble and rheumatism."

In closing the examination of this work of Prof. Miller, it is impossible to avoid the conclusion that it has no counterpart in dental literature. That to the author belongs the credit of finally solving the great problem of dental caries, there can be no question; but this honor must be shared with a long list of able men who laid the foundation for the final solution. Years must elapse before the entire subject is cleared of all its difficulties, but that seems to be simply a question of labor, the fundamental principles that govern this pathological condition being settled.

It is a cause of congratulation that this subject has been made so clear that there seems no available ground for disputations regarding the conclusions arrived at. It is also a cause of gratification that this work has been accomplished by one of our own household. Caries has been too long the opprobrium of dentistry, and it seemed, at one time, as though a solution would never be reached by one of our own profession. This danger, happily, is now passed, and it remains for the dental profession to give evidence of their appreciation and gratitude by placing this work in the libraries everywhere. No one can afford to be without it.

It is the intention to reprint it in this country, and it will then be available to English readers everywhere.

JAMES TRUMAN.

PEARSON'S DENTAL APPOINTMENT BOOK.

This is a very neat and compact little book, bound in red Russia leather with pencil attached, and arranged for appointments for eight hours for every week-day in the year; also having blank pages for memoranda. It can be carried in the vest-pocket, and is sold for 50 cents; with dentist's name in gold on cover, 75 cents. It is published by R. I. Pearson & Co., Kansas City, Mo.

THE PRINCIPLES AND PRACTICE OF SURGERY. By JOHN ASHHURST, Jr., M.D., Barton Professor of Surgery and Professor of Clinical Surgery in the University of Pennsylvania, etc. Fifth edition, enlarged and thoroughly revised. With 642 illustrations. Octavo, pp. 1094 and index. Philadelphia: Lea Brothers & Co., 1889. Price, cloth, $6.00; leather, $7.00.

In this fifth edition of his valuable work the author has evidently labored to present a comprehensive but condensed description of the methods of practice now generally employed in the treatment of surgical affections, with a plain exposition of the principles underlying such practice. The general arrangement of the volume is the same as in previous editions, but all the departments have been carefully revised and a large amount of new material has been introduced, and a considerable addition made to the number of illustrations. A feature worthy of note is the attention which has been given to surgical specialties, such as diseases of the eye and of the ear, the thorough revision of such chapters by well-known specialists having been secured. As a compend of modern surgery the volume is a reliable and satisfactory presentation.

OBITUARY.

DR. JEFFERSON D. HULEN.

DIED, in Centralia, Boone Co., Mo., November 8, 1889, of typhoid fever, JEFFERSON D. HULEN, in the twenty-ninth year of his age.

Dr. Hulen was born in Monroe county, Mo., near Middlegrove, in 1861, and began his studies in dentistry at the age of twenty, in Moberly, Mo., in the office of Dr. W. K. Christian. He subsequently attended the Missouri Dental College, in the class of 1882–83. He began the practice of dentistry with his brother, Dr. J. A. Hulen, in Centralia, Mo., in the spring of 1883, and remained there until his death. Modest, capable, and obliging, he soon acquired a very good practice, and made many warm friends. He was a member of the Christian Church, and was extremely conscientious and faithful in the discharge of every duty. In his death the profession has lost an earnest and proficient member, whose qualities of heart and mind endeared him to all who knew him. He leaves a wife, and a daughter of five years of age.

PUBLISHER'S NOTICE.

THE NEW VOLUME.

THE DENTAL COSMOS has certainly been long enough before our readers to make them familiar with the course it has sought to follow and in which it is proposed that it shall continue.

With this number it enters (with a new dress) upon its thirty-second volume, with the indications all pointing to a larger subscription list than ever before, although the average circulation during 1889 was within a fraction of eight thousand.

After the general and special text-books of a profession or a specialty, a good monthly journal is the most indispensable aid in practice, and nowhere else can so much information be obtained for an expenditure of a like amount of money.

To the dentist, whose success is so largely dependent upon manipulative skill, a periodical literature which constantly presents fresh and practical ideas, suggestions, and methods is especially necessary.

We call special attention to the TOPICAL INDEX which accompanies each number, as well as to the GENERAL INDEX to the contents of the volume such as appeared in the issue for December, and which will hereafter be a permanent feature.

Four pages in double columns of specific references to every noticeable detail and concerning every subject treated of, and as well the name of every writer and speaker whose utterances are recorded, accompany each number. These at the end of the volume are collated and alphabetically classified, and together make sixteen pages of double-column references to the contents of the volume.

The value of this monthly and yearly index we think cannot fail of due appreciation—cannot fail to make the DENTAL COSMOS indispensable to the library of every intelligent dental practitioner.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

THE EXPRESSIONAL SERVICES PERFORMED BY THE FACE.

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"Nature speaks in the forehead and the face, and in the silence of the mouth."—ADAMANTIUS, A.D. 415.

"The heart of a man changeth his countenance, whether for good or evil." —THE SON OF SIRACH.

THE face is the servant of the emotions. It mirrors the feelings and gives expression to the impulses. It is the visible record, the map of the heart, advertising the character of the man to all who care to read. It is the herald of the heart, proclaiming the man. It betrays the impulses which underlie his actions. The face also serves the mind when it is affected by the heart and the emotions; and as most actions and thoughts are caused by the emotions, the face is often summoned to picture forth the feelings that affect volition. It thereby reflects the mind by betraying the impulses that prompt thoughts or actions. It is, therefore, the servant of the conscious activities. It does not reflect unconscious or automatic thoughts or actions. It is the mirror of the living soul,—not of the house in which it lives nor of the machine which it moves.

The face is the expressional area, *par excellence*, wherein the physiognomy of the individual, as revealing his character, is most indicated. The face is, indeed, physiognomy condensed. While it is but a factor of the sum total of the physiognomy of the individual, as expressed in all parts of the body, it is the most important factor and is far more expressive than any or all the other parts. Physiognomy is merely a division of physiology,—not an occult science for the reading of character,—and indicates the impress of psychic influences upon physical structures; *i.e.*, the body takes the impress of the mind and heart, and their visible appearances are observed in the outward form and peculiarities of the individual. As thus indicating character, the physiognomy of the face is the concentrated expression of the peculiarities of his mind and heart. While character is revealed in all the parts of the body and their motions,—the trunk and its carriage, the limbs and their gestures and the walk, the head and its poise, the dress and its disposal,—it is in the face that it is most clearly written. Indeed, very early in the history of the race it was noticed "that the good and evil passions by their active exercise stamp their impress upon the face, and that each particular passion had its own expression. From a very early age of human thought this fact attracted philosophic consideration" (Alex. McAlister.) But the ancients delighted much in the reading of character and foretelling the future of individuals by their physiognomy. We have to deal with it now merely as a physiological function.

Mr. George Romanes says that "in animals as with man there is obviously a 'logic of feelings' that is translated into a 'logic of signs.' This logic of signs, at any rate in its higher development, has exclusive reference to the representative faculties, and is first evoked by those exigencies of life which render necessary or desirable the communication of ideas. . . . Each development of the sign system, although first called forth for the communication of ideas, afterwards reacts on the structure of ideation from which it arose, to cause its advancement. . . . The germ of the sign-making faculty occurs among animals as far down in the scale as the ants, and is highly developed among the higher vertebrates. Pointer dogs make gesture signs, terriers 'beg' for food, and the cat, dog, horse, and even other animals will lead man by signs to their companions in distress. The animal is thus capable of converting the logic of feelings into the logic of signs for the purposes of communication. It is a sign language as much as that of the deaf mute or savages." From these beginnings the principle of communication arose, sign and gesture language was developed, and facial expression, as an auxiliary of gesture language, was evolved. M. Alfred Fouillée writes that "with man the muscles of the face are relatively small and mobile, and for this reason the countenance is the best index of the degree of intensity of feeling; and the ear, motionless in man, is a marked organ of expression in the horse. . . . With the cat and dog, the mobility of the tail makes it capable of furnishing the indication of every feeling. . . . Animals express the passions of their race in their organs and attitudes, and men in turn reproduce in themselves various types of animality. Different races of men have their varieties of physiognomy, according to the predominant traits of their character, and different nations among men of the same race."

Facial expression is, in its last analysis, sign language. It belongs to the realm of "gesture speech,"—communication by gestures of the features. As Mr. Garrick Mallery says in his contributions to the study of sign language ("Report of Bureau of Ethnology," vol. i), "Gesture speech is divided into corporeal motions and facial expression. . . . A play of feature, whether instinctive or voluntary, accentuates and qualifies all motions intended to serve as signs, and strong instinctive facial expression is generally accompanied by action of the body or some of its members. But, so far as distinction can be made, expressions of the features are the result of emotional, and corporeal gestures of intellectual actions. The former in general and the small number of the latter that are distinctly emotional are nearly identical among men, for physiological causes which do not affect with the same similarity the processes of thought. The large number of corporeal gestures expressing intellectual operations require and admit of more variety and conventionality. . . . Sign language necessarily includes and presupposes facial expression when the emotions are in question. . . . The earliest gestures were doubtless instinctive and generally emotional, preceding pictorial, metamorphic, and conventional gestures, which in turn preceded articulate speech, according to Darwin. . . . While it appears that the expressions of the features are not confined to the emotions, the movements of the hands or arms are often modified or accentuated by associated facial changes. These infuse life into the skeleton sign and belong to the class of innate expressions. . . . Emotional expression in the features of man is to be considered in reference to the fact that the special senses either have their seat in or in close relation to the face, and that so large a number of nerves pass to it from the brain." He describes several instances where complete conversation has been carried on by facial expression alone,—showing the possibilities of intellectual as well as of emotional expression of the face. Facial expression differs from sign language in that the latter, like oral speech, has become conventional among tribes by whom it is extensively employed; but the former still bears its primitive graphic and representative relation to thought and feeling. It pictures feelings, illustrates thought, and is therefore the remains of the original, primitive sign language, which was pictographic. Sign language and its analogue, facial expression, "are so faithful to nature that they will endure, while vocal speech will undergo many vicissitudes of development and retrogression." Being among the earlier evolved expressional habits, facial expression will be among the last to change, while vocal speech and even sign language will become conventionalized and undergo many changes, so as to lose all semblance to ideographic signs. Facial expression is part of the natural sign language, and consists largely of hereditary impulses left over from a primitive state. So the signs given by the features, indicative of what is going on within the mind, are direct and simple. Even children, babies, notice the expressions of the face and judge of the intentions of persons toward them. The power to read signs is, of course, an hereditary instinct, just as the sign language of the face is hereditary. Both are from an epoch in the evolution of the race when articulate speech was undeveloped and even gesture language was unconventionalized.

M. Alfred Fouillée again writes, "Diderot said, 'Every gesture is a metaphor,' which characterizes the translation of the feelings into corresponding movements which we call expression. But though the natural language of physiognomy and gestures is metaphorical, it is not composed of symbols in any degree arbitrary. Expression is part of the fact of feeling. Emotions may be felt without external expression; but it is, as Darwin says, a tension of the will against the emotions. . . . All expression of feeling has by its definition a psychological and social side. . . . The language of passions is eminently communicative. . . . All acts of expression are best explained by the physiological and sociological law of solidarity and sympathy. . . . There is solidarity, at once mechanical and mental, between the parts of the organism, the brain and heart, and the muscles of the face. . . . Darwin says expressional movements are habits and have become transmitted when they have lost their utility. . . . It is in the very tissues of the organism, in the inmost properties of the living substance, that are found the mechanical and physiological reasons for the phenomena of expression. . . . In the physiological view, the law that links the emotion with its exterior signs is the same that governs all the manifestations of life and force,—it is the law of equivalence of movements. . . . According to Herbert Spencer, whose theory is physiological, energy of feeling is always manifested by an energy of movement of expression; but these are often superficial and not to be read rightly, except by close observers. . . . According to some, we should seek the real origin of the movements of expression in the effect of the emotions, not in the intelligence, but in the primary activities and desires. Thus pleasure is essentially an augmentation of vital activity, while pain is a diminution of it. . . . Expression and contraction are at the origin of all the other vital movements, and of course of the signs of expression. . . . The movements of expression, through evolution, have led to desire" by reason of increased blood-flow to the parts, or to the nervous tissue which is the seat of the desire, and diminished blood-flow causing contraction leads to dislike and repulsion. . . . In joy the different parts only reproduce and aid the general movement of expression : the features dilate, the eyebrows turn upward, the entire physiognomy opens, the voice rises and swells, the gestures expand into more ample and numerous movements. The expression of joy is a general expression of liberty and of liberality. . . . In the immediate expression of pain the depression of activity is manifested by a general depression of vital force. . . . 'The lips are relaxed,' says Sir Charles Bell, 'the lower jaw drops, the upper eyelid falls, the eyebrows incline like the mouth, some other muscles become tense.' . . . The will resists pain, but consents to pleasure. Expressional movements, accumulated according to laws, end by fixing themselves and by leaving traces, not only in passing attitudes, but also in the permanent attitude which constitutes the form of the features. Persons leading the same life, as man and wife, sometimes acquire a similarity of physiognomy. . . . The professions also leave their traces in the form of organs and features."

Mr. Charles Darwin, in his work on "The Expression of the Emotions in Man and Animals," gives us the best exposition of the scientific study of expression. Indeed, his great work did more than any other of recent years to rescue the science of physiognomy from the quack and charlatan (by whom it had been employed for centuries for occult and fantastic purposes in character-reading or foretelling the future of the individual), and gave to it a scientific basis. He has been followed by other purely scientific students of expression, so that to-day it is pursued in a rational way. It is now studied from a physiological, or perhaps rather a psycho-physiological stand-point.

Mr. Darwin begins by giving "the three principles which appear to account for the most of the expressions and gestures involuntarily used by man and the lower animals under the influence of various emotions and sensations. . . . The first is the *principle of serviceable associated habits.* Certain complex actions are of direct or indirect service under certain states of the mind in order to relieve or gratify certain sensations, diseases, etc., and whenever the same state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least use. . . . It is notorious how powerful is the force of habit. The most complex and difficult movements can in time be performed without the least effort or consciousness. As physiologists say, 'the conducting power of the nervous fibers increases with the frequency of their excitement.' . . .

"The second principle is *antithesis.* Certain states of the mind lead to certain habitual movements which were primarily, and may still be, of service, and when a directly opposite state of mind is induced, there is an involuntary tendency to the performance of movements of a directly opposite nature, though these have never been of any service. . . .

As the power of intercommunication is certainly of high service to many animals, it is probable that gestures of an opposite nature to those by which certain feelings are already expressed should at first have been voluntarily employed under the influence of an opposite state of feeling. The fact of gestures being now innate would be no valid objection to the belief that they were at first intentional, for if practiced during many generations they would probably at last be inherited. . . . With conventional signs which are not innate, such as those used by the deaf and dumb and by savages, the principle of opposition or antithesis has been partially brought into play. . . . The tendency to perform opposite movements under opposite sensations or emotions would, if we may judge by analogy, become hereditary through long practice, and there cannot be a doubt that several extensive movements due to the principle of antithesis are inherited. . . .

"The third principle is that *certain actions*, which we recognize as expressions of certain states of the mind, *are the direct result of the condition of the nervous system*, and have been from the first independent of the will, and, to a large extent, of habit. When the sensorium is strongly excited, nerve-force is generated in excess and is transmitted in certain directions dependent on the connection of the nerve-cells, and, so far as the muscular system is concerned, on the nature of the movements which have been habitually practiced. Of course every movement which we make is determined by the constitution of the nervous system, but actions due to the will or to habit are not now to be considered. . . . An instance of this is trembling of the muscles. This could not originally have been of any service not acquired through the will, nor be rendered habitual through association with any emotion." But Mr. Darwin admits further along that "of all emotions, fear notoriously is most apt to induce trembling," but so do occasionally great anger and joy. . . . It may be caused by any strong excitement of the nervous system which interrupts the steady flow of nerve-force to the muscles. . . . The secretions of certain glands, the kidneys, mammæ, or the skin, are often affected by strong emotions independently of the will or any serviceable associated habit. . . . The heart is extremely sensitive to external stimulants or excitement. . . . The vaso-motor system is readily affected, as when a person blushes from shame. . . . The hair rises under the influence of terror or rage. . . . Tears are shed during grief and some other emotions." He notes many other manifestations of expressions of the emotions not due to the will nor to habit, and says that "on the whole we may conclude that the principle of the direct action of the sensorium on the body, due to the constitution of the nervous system, and from the first independent of the will, has been highly influential in determining many expressions. . . .

"That the chief expressive actions exhibited by man and the lower animals are now innate or inherited—that is, have not been learned by the individual—is now admitted by every one. So little has learning or imitation to do with several of them that they are always beyond control. . . . The inheritance of most of our expressive actions explains the fact that those born blind display them, and the young and old of widely different races, both man and animals, express the same state of mind by the same movements. . . . We hardly perceive how remarkable it is that a young puppy should wag its tail when pleased, or a kitten should arch its little back and erect its hair, and spit, when angry, just like older animals. . . . Actions of all kinds, if regularly accompanying any state of mind, are at once recognized as expressive. . . . Few points are more interesting in our present subject than the extraordinary complex chain of events which lead to certain expressive movements. Take, for instance, the oblique eyebrows of a man suffering from grief and anxiety, . . . or the contraction of the muscles about the eyes during screaming, first performed by infants to counteract the engorgement of the eye-sockets by blood. Slight movements, such as these, or the scarcely perceptible drawing down of the corners of the mouth, are the last remnants or rudiments of strongly marked and intelligible movements in an earlier stage, but they are now full of significance in regard to expression. . . .

"It is curious, though perhaps an idle speculation, how early in the long line of our progenitors the various expressive movements now exhibited by man were successively acquired. . . . The movements of the face and body, whatever their origin may have been, are in themselves of much importance for our welfare. They serve as the first means of communication between the mother and her infant; she smiles approval and thus encourages her child in the right path, or frowns disapproval. We readily perceive sympathy in others by their expression. The movements of expression give vividness and energy to spoken words. They reveal the thoughts and intentions of others more truly than do words, which may be falsified. Whatever amount of truth the so-called science of physiognomy may contain appears to depend, as Haller long ago remarked (quoted by Moreau in his edition of Lavater), on different persons bringing into frequent use different facial muscles, according to their dispositions; the development of these muscles being perhaps thus increased, and the lines and furrows on the face due to habitual contraction being thus rendered deeper and more conspicuous."

(To be continued.)

THE DENTAL DIPLOMA, THE DENTAL COLLEGE, AND DENTAL LEGISLATION. AN EXAMINER'S EXPERIENCE, AND SUGGESTIONS BASED THEREON.

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PRESIDENT MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

(Read before the First District Dental Society of the State of New York, December 10, 1889.)

It is safe to say, I think, that outside of my own State no one has had or could have such an experience as has been mine the past two years. A few other States have similar laws and their examiners have had a like experience, but not, I imagine, to the extent of my own.

A great majority of the States, in their dental laws, require from the dental graduate only the presentation and verification of a diploma from a reputable college.

Considerable criticism has been made of the Massachusetts law. I had no part in its formation and for a time thought the criticism well founded, but a more extended experience and observation has convinced me that its provisions are wise and just.

It has been claimed that a State does not deal equitably and has no legal right when, having by its sovereign power granted a charter to an institution to educate a citizen for a specified vocation, and with its parchment and seal to certify that he is so qualified, it then raises an additional barrier which must be surmounted before the citizen thus equipped can legally enter upon the rights and privileges of the particular vocation. Even were I able, I would not take your time to discuss this question at length. I will remark only that it is my impression that under the many rulings of our courts, State and national, there has been a steady increase in the breadth, comprehensiveness, and power of the state's right in the regulation of matters of police. Under this head are grouped order, health, sanitation, nuisances, and kindred subjects. *Ex post facto* laws have been universally declared unconstitutional. The recent decision in New Hampshire declaring its medical and dental laws unconstitutional was summed up in the following words: "The constitutional objection to the statute is that it imposes the burden of a license fee upon certain persons and exempts others of the same class and profession under similar circumstances and conditions." The objectionable clause is contained in Section 8, which declares that "the provisions of the preceding sections shall not apply to persons who have resided and practiced their profession in the town or city of their present residence all the time since January 1, 1875." The law came into force January 1, 1879.

In proscriptive legislation the tendency has been in recent years, to a somewhat alarming extent, toward a more and more paternal assumption of rights and powers by the state in what used to be considered matters for individual decision.

The ruling of the courts has also been in harmony with this advance. As an illustration, I need only call your attention to the approval by the Supreme Court of the United States of the decision of the Kansas courts, practically confiscating property by rendering it valueless through a law prohibiting a manufacture which up to the enactment of the prohibition had been legal. Equity would seem to demand of the State that the ruined owners should be reimbursed, but the decision was otherwise.

On January 14, 1889, the Supreme Court of the United States rendered a decision affirming a decision of the Supreme Court of Appeals of the State of West Virginia, which had given judgment against one who had violated the medical law of that State. In the opinion, Justice Field says, "It is undoubtedly the right of every citizen of the United States to follow any lawful calling he may choose, subject only to such restrictions as are imposed on all persons of like age, sex, and condition. This right may, in many respects, be considered as a distinguishing feature of our republican institutions. Here all vocations are open to every one on like conditions.

"The right to continue the practice of professions is often of great value, and cannot be arbitrarily taken away, any more than real or personal property can; but there is no arbitrary deprivation of such rights where its exercise is not permitted because of a failure to comply with conditions imposed by the state for the protection of society. The power of the state to provide for the general welfare of its people authorizes it to prescribe all such regulations as may be necessary to secure the people against the consequences of ignorance and incapacity, as well as of deception and fraud."

The Massachusetts law treats all alike, provides that "every person who is at that time engaged in the practice of dentistry in the State" shall be licensed, "and may continue to practice without incurring any of the liabilities or penalties provided in this act." It then provides that "all persons" not in practice at the time of the enactment of the law shall pass a satisfactory examination before they can legally enter upon practice. It exempts from the restriction no privileged class,—the graduates of dental colleges,—but, in the language of Justice Field, each is "subject only to such restrictions as are imposed upon all persons of like age, sex, and condition."

I am not informed what judicial decisions, if any, have been made in regard to the power of the state to restrict the right to practice of a graduate from an incorporated college. It is my impression that the incorporation by the state of a college has not as its main object the granting of privileges to the graduate which shall be his as a vested right by virtue of his possession of its diploma duly signed and sealed, but that its main object is to grant corporate rights and privileges affecting the holding of property, organization, and government, and the freedom from personal liability in distinction to voluntary and individual association or partnership, and incidentally to insure permanence and stability to institutions of learning. The great end in view is not the granting of the certificate that the student is competent, but the educating him so that he shall be competent.

The authority to confer a degree is a valuable concession by the state, and the degree certifies to the world that the recipient has complied with the requirements of the college to the extent that he may be proclaimed an educated man in its line of teaching, but it does not, I think, confer "rights and privileges" superior to what the state has enacted or may enact as qualifications requisite for the protection of property, life, or health.

Our law, as originally prepared and presented, exempted the college graduate from examination, and it is a fact that the amendment changing this was offered and advocated by the lawyers in the legislature, so as to make the dental law conform to the custom which had obtained from time immemorial, that the graduate from a chartered law school must be examined by the court before he could be admitted to the bar. What rights and privileges in his chosen vocation does the diploma from a law school give, and where are those rights and privileges when the court has convicted him of malpractice and disbarred him?

It is the custom of some countries, England for example, and has been suggested for us, to have the educating institutions simply that, and all examinations and degrees conducted and conferred by a separate state council, before which the graduate of all institutions must appear.

In our country also it is generally a very easy matter to obtain a charter for a college. There is little or no inquiry into the object and still less into the responsibility, respectability, or standing of the corporators. In some States there is a general law under which a college can be chartered as easily as a church, a manufactory, or a yacht club. One city, I am told, has seven dental colleges of varied size, plan, and respectability.

It is much to be desired that the dental diploma in this country should represent in every case a fair knowledge of common branches and of the English language, the same broad and liberal scientific culture, the same thorough technical training, the same length of time occupied in its acquisition,—in a word, that each holder of it should be a well-educated and skillful dentist; but does it?

Have foreign governments in excluding it been always partisan and unfair?

Most of us have earned it by hard labor and study; but is it so with all? Does it or does it not express something definite and positive?

Should the state always receive it unquestioned, even from a reputable college, and trust its children to the tender mercies of its possessor with implicit confidence? It represents more now than it used to, I am happy to say, but it will represent still more in the future. The mass of the profession is alive to the demands of the hour. Nearly all are in favor of a higher education and a more strict observance of prescribed requirements.

The progress of the past few years has been great, and last summer witnessed another advance, though not in every respect a fair and equal one. The increase of required time for study from two to three years was good as far as it went. It would have been better in every way, more fair and equitable, if the time had been kept at two years, and each year in all colleges advanced to nine months' length, but the managers of the short-term schools were too numerous and too good business men to come up to the higher level which some schools have bravely maintained at great pecuniary and competitive disadvantage.

A recent incident will illustrate my point. Last October two young men holding the British L.D.S. called upon me with a letter of introduction from a friend eminent in his city, at whose house I passed some pleasant hours last summer, and who is the dean of the school which educated them. They were bright young men, and came to this country to supplement their home instruction by an American one. I sent them to the dean of the Harvard School for information. In the afternoon they returned to my office and reported that they had decided to go to a dental college in another city, for the reason that by such a choice they could return home in March rather than in June. They wished to carry home with them the American education, and "something to show for it," *i.e.* the diploma. By selecting another city than Boston they could accomplish this and save three months.

It would be interesting if we could know what would be the condition of dental education in this country to-day if there had been no dental legislation. We can only conjecture that probably to this cause more than to all other causes combined are we indebted for the improvement.

I will not, however, be too captious, but rejoice in each step of progress, though it is halting and of less than martial length.

In our examinations, to secure the best results and for convenience and expedition, the subjects were apportioned as follows: To one member was given chemistry; to another anatomy, physiology, and histology; to another prosthetic dentistry, metallurgy, pathology, and irregularities; to another materia medica, therapeutics, and anesthesia; and to another operative dentistry and surgery.

In the past two years we have at seven meetings examined seventy-two men and one woman; total, seventy-three. The largest number at one meeting was thirty-four. Of the total number, fifty-five were graduates from dental colleges, two were graduates in medicine, and sixteen had no degree. In the latter class a number, seven, I think, had attended one or more sessions at dental colleges, and others had large experience in practice ranging from twenty years down.

Our law gives the candidate the choice of an oral or written examination; all chose the oral examination.

Most of the candidates have also been required to demonstrate their practical proficiency by operating before the board. In the future this part of the examination will be given greater prominence.

Of the total number, some have come up a second and some a third time for examination. Nine men have failed to show sufficient knowledge or skill to receive the certificate; of these, one was a graduate in medicine and eight had no degree. Sixty-four have passed successfully; of these, fifty-five were graduates from dental colleges, one had the medical degree, and eight had no degree.

It will be noticed that one-half of the M.D.'s and one-half of the non-graduates were successful and the other half unsuccessful, while all the graduates of dental colleges were successful; but it is also true that all of the graduates were not passed at their first examination.

In tabulating the six examinations in 1888 and 1889 we find that in the examinations of April 4, 1888, the four examined had graduated the preceding February and March. In that of July 13, four had graduated in June, two in 1885, and one in 1860. In that of December 6, three had graduated the previous spring, one in 1887, one in 1886, and two in 1884.

Summary from 1888: 11 had graduated the same year; 1 in 1887; 1 in 1886; 2 in 1885; 2 in 1884; 1 in 1860.

In 1889 there have been three examinations. In that of March 27, five had graduated the previous month, one in 1887. In that of July, twenty-six had just graduated,—twenty-four of these the previous month,—one had graduated in 1888, and one in 1872. In that of December 4, one had graduated in 1886 and one in 1880.

Summary for 1889: 31 had graduated the same year; 1 in 1888; 1 in 1887; 1 in 1886; 1 in 1880; 1 in 1872.

Summary for 1888 and 1889: 42 had graduated the same year; 2 had been graduated one year; 2 two years; 3 three years; 2 four years; 1 nine years; 1 fifteen years; 1 twenty-eight years.

I have prepared these tables to show that a great majority—forty-two out of fifty-four—were examined when fresh from their studies, thirty-seven out of the forty-two having been out of college less than five weeks. It will be just, I think, to claim that these graduates from seven dental colleges quite accurately represent the status of a graduate upon completing his college course.

It is not of much importance, and I mention it only as an illustration, that one of those examined last July who graduated in the early spring of 1889 (I do not mention the exact date, as from that you could tell the college), in filling up the blank form of application wrote the statement of birth as June 28, 1868, showing the applicant to have been some months under twenty-one when graduated.

In conducting my examinations as a member of the board, and in this review of the work of the colleges, I stand upon the vantage ground of being no novice in education. Many, many years of experience in teaching, as well as observation, have made me well acquainted with the quality of the material which the colleges have to deal with. I have met the student in the intimate relation of instructor and pupil. I have experienced the teacher's enthusiasm and disappointment, the pupil's inattention, listlessness, and shirking. I know, I think, what can be reasonably expected from a fresh graduate, and it is from that stand-point and with those rather low expectations that I have judged of the fitness of the applicant to receive a favorable verdict, and of the work of the college which graduated him. And it may not be out of place for me here to make the confession that the certificate has in some cases been granted to graduates with great reluctance and mental reservation, and on account of considerations which were honorable and of force to affect the decision of the board, but which we are convinced should not in the future have the weight which they have had in the past. I do not think it prudent to enlarge on this point. The board was honest and conscientious in what it has done. The main motive for this paper is to make this admission, and to let it be known publicly that in regard to one of the considerations referred to the board feels that in the future its course should not be so lenient, and that after this public expression of the results of its experience it will not be justified in sanctioning or condoning the mistakes or shortcomings of dental colleges.

Under the laws of most States the examiners have only to investigate whether a college is "reputable," and if decided affirmatively all its graduates are licensed unquestioned. Heretofore there has been little revision of college work and thoroughness. Under the Massachusetts law the board has nothing to do with colleges, their methods, or their repute, but each member in "qualifying" under his commission has taken his oath that he will examine "all persons with reference to their knowledge and skill in dentistry and dental surgery, and if the examination of any such person or persons shall prove satisfactory to said board, the board shall issue to such persons as it finds to possess the requisite qualifications, a certificate," etc. The board is sole judge of what constitutes "the requisite qualifications." The State, trusting in the discretion and probity of the "five skilled dentists of good repute," as the law reads, has committed to them a trust, and their duty is to the State and its inhabitants. Their course should be, in the language of Justice Field, "to secure the people against the consequences of ignorance and incapacity."

In the performance of this duty it is a serious and solemn matter to withhold the license to practice from anyone who considers himself competent, but it is especially disagreeable and onerous to do this in the case of one who has pursued the courses of study in an institution, successfully passed the ordeal of its examination, and with music and flowers and joyous celebration has received from it the formal proclamation that he is a Doctor of Dental Surgery, and has returned to his friends flushed with success and justifiable pride. I do not wonder that with such an indorsement he resents a further inquisition by the State as to his fitness and competence. I wonder still less if, failing to pass this additional test, his disappointment and chagrin should be extremely poignant, and that he should entertain wrathful feelings against what he must consider an unjust and wrong decision.

We hope to be spared the performance of such an irksome duty; but as time after time we have inquired "with reference to the knowledge and skill in dentistry and dental surgery" of the graduates who have appeared before us, the conviction has been gradually growing stronger and stronger that the work of the colleges must be improved, and especially that they must discriminate more carefully in the disposal of their honors. Their opportunities for a full and thorough investigation of the merits of candidates for graduation are better than ours. Their duty to carefully guard the portals to practice is no less than ours. They have taken the money of the student under a contract to educate him. They have forewarned him that he must not expect his diploma until by application and study, varying with his intellectual and mechanical endowment, he is master of the required knowledge and has the ability to apply it.

The ambition to swell the list of graduates should have no place in their minds. What would be thought of a college which, having learned that a rival institution was about to graduate three more than itself, should call back five whom it had already rejected, give them a second examination, and pass them in order not to be eclipsed by its rival? And yet this story is told. Yes, gentlemen of the colleges, we urge you to greater circumspection in the disposal of your diplomas for the honor of the colleges, the good of the profession, and incidentally to relieve us from the necessity of passing an unfavorable judgment upon your fidelity to your trusts.

It is reasonable that you should ask me, after making such general and sweeping statements, to be more explicit. To do this I must enter somewhat into details, even at the risk of wearying you.

Dentistry more than most vocations forms a connecting-link between the professions and the trades, and must in its highest development exemplify each. In so far as its aims are benevolent and beneficent, its investigations and studies confined to vital organs and functions, and its culture broad, liberal, and scientific, it is a profession. In so far as it deals with practical and mechanical operations, with the training of the hand to execute and in much of the daily routine of the office, it is an art or trade. It approximates one or the other in proportion as it meets these tests.

The best dental college is the one that exemplifies to the highest degree this varied and extensive training. Theory and practice, science and work, must go hand in hand in our colleges, and neither can be magnified at the expense of the other.

I have had less experience than my colleagues in testing the breadth and thoroughness of the teaching of the basal medical and scientific branches, and I hesitate to essay criticism on these points. I may say, however, in passing, that it is my impression that in most of the colleges there is little criticism to be made of the quality, quantity, or scope of the teaching in this respect. It is generally above and beyond the capacity of the average student, who takes less interest in comprehending it than in mastering the practical branches. My experience has been mainly with the teaching of the theory and principles of operative dentistry, and the results of the infirmary drill.

When we take into account that the student, if earnest in anything, is apt to be in respect to operative dentistry and the acquisition of skill, I am surprised at the poor results seen in the graduate.

I cannot take your time to enlarge upon all the points calling for criticism. I will try and confine myself to a few of the more salient.

The want of early manual training should perhaps be placed first. The students now very generally go to the college without having had much or any private pupilage. In former times they had as a foundation for college study and drill the experience sometimes of years in an office, where they learned some theory, and saw operations and methods, sometimes not of the best, but, what was more important, in the irksome drudgery of the laboratory obtained a mastery of tools and of the hands which fitted them for rapid progress in the college.

In some schools there is a want of harmony between the teachings of the lecture-room and the infirmary. The lecturer recommends one course and the clinical professor or demonstrator another. The student is confused as to which is best. I know a school where the professor of operative dentistry details at length and advocates the use of non-cohesive gold, but in the infirmary the opposite is taught. Whoever is professor of operative dentistry should also be of clinical dentistry, and head demonstrator, and not simply a lecturer and occasional clinician. He should be master of the whole department, from the enunciation of principles and theory to their practical application, and all assistant instructors should be under his immediate control and direction.

While I have no doubt that in the schools the lecturer gives didactic explanations of different materials and the various methods of using them, I have found from the demonstrations of graduates that they have received little or no drill except in one or a few. In some infirmaries the student sees only one kind of gold and one method of using that, except from occasional clinics, and is not allowed to use any other kind or method. An incident will illustrate. A graduate who had been examined in theory came to my office, using my spare operating-room, to fill a tooth to demonstrate his skill; when he was ready to introduce the gold, he found that he had forgotten to bring it. I offered him all the kinds, cohesive, non-cohesive, plastic, etc., I had in my office, but he could use none of them. The operation was adjourned, the rubber-dam taken off, and the next day he returned, bringing the only gold he knew how to use, and the operation, a simple crown cavity in a superior molar, was completed.

While the student may hear and record in his note-book and perhaps memorize a multitude of facts, statistics, rules, and principles, there is an almost utter failure to secure what the word "education" means, namely, "a drawing out," a stimulating of the intellect to think and reason, to deduct conclusions from certain premises; and above all and beyond all, at all times and everywhere, to project into everything the great foundation principle of all progress, all right thinking, and all useful performance, the should be omnipresent "Why?" Theory and facts are of little importance in the college; he will get all these later, provided in the daily intercourse in all departments of teaching and drill the intellect is awakened, and the student is shown how he may reason, and has stamped indelibly into every molecule of his brain that most important punctuation-mark the interrogation-point. I regret to affirm that I have found this failing almost universal. The applicant answers my question glibly enough, perhaps, but when I then ask "Why?" he is generally unable to give a reason, or if he does it is guesswork, and very likely wrong. I am aware that "bricks cannot be made without straw," and that you cannot train an intellect which is absent, but my statement is true of the bright men as well as of the dull ones. The fault is with the system, and I have not the slightest doubt that if the college men are convinced that "I have not drawn too long a bow" there will be a great improvement in this respect.

In none of the colleges is there a sufficient force of demonstrators. The student may operate often, and with ambition to learn and excel, but he cannot make proper improvement unless his operation is overlooked from beginning to end at short enough intervals to make sure that each step is well taken. Some colleges have sixty or seventy chairs. How many demonstrators are there present all the time? I ask anyone who has had experience as demonstrator if he does not consider that he has been handicapped as an instructor by having too many operators to look after? Is it a rule in every college that no student shall ever commence the insertion of a filling until the cavity has been pronounced properly prepared by the demonstrator? This would seem to be a reasonable rule.

Are the demonstrators always selected for faithfulness and competency? Is a man who graduates one year generally competent to instruct a student the next year, to be the arbiter as to the how, what, and why of the multifarious and complicated conditions that are constantly arising? Such young men, without practice, can be hired cheap. But does the college fulfill its contract with the student by having young and cheap instructors, in the infirmary least of all places, though the professors may divide several thousand dollars apiece each year?

Suppose one college furnishes only No. 3 gold in the infirmary and sells each sheet for seventy cents, making a profit of sixty dollars per ounce, and another college furnishes No. 4 gold and sells it at forty cents a sheet, making a profit of fourteen dollars and forty cents per ounce, would it not be reasonable to infer that the former was run more for profit to the college and the latter more for the advantage of the student?

Has the infirmary answered its purpose when it has been successfully run as the Cheap John shop?

It is not germane to this paper, but is it true that the English have a better system than ours? In all their larger towns they have dental hospitals, supported by subscription, which are hospitals indeed as well as in name, while we have not one. These hospitals when connected with dental schools are as useful as our infirmaries for instruction and are true charities for the poor, while no one can claim that our college infirmaries truly deserve the designation of charities. Whatever we may think or say of our English brother, to him belongs the credit of adorning the dental profession with that grace which has been declared the greatest of the three, charity.

I have had one question which I have asked of nearly every man examined. I think by this time it must have been passed around among the younger students, especially in Boston, so that I cannot use it longer. I am sorry to give it away publicly, for it has been a source of great amusement to me. I have supposed a lower molar with three cavities, one on each of the surfaces, grinding, mesial, and buccal, the mesial and buccal cavities extending to or under the gum.

No metal could be used for filling, but only the so-called temporary materials, gutta-percha and oxyphosphate of zinc. The question was which of these should be used in the grinding-surface, which in the mesial, and which in the buccal, for durability, and why in each case. A few, like the old non-graduate of twenty years' practice, have answered correctly and understandingly, but the large majority of graduates have had no clear and settled rule of practice as to where to place the one or the other, and still fewer could give a scientific reason. And even those who have felt the inspiration and drank in wisdom from my friend, the great apostle of plastics, have shown no fuller knowledge than those taught in other schools. Some have an impression that the phosphate would not stand well near the gum, and when I asked why, said that it would be washed away. "By what?" I asked. "By the fluids of the mouth?" "Yes." "As a clay-bank is washed away by the rain?" "No," some bright one replied, "be dissolved." "As sugar is dissolved in a glass of water?" I asked. The very bright ones would finally by my aid hit upon chemical solution. But they still knew no solvent but the fluids of the mouth, and this they almost always said was the saliva. Nearly every graduate seemed to be ignorant that there were any mucous follicles to contribute to the fluids of the mouth. I have no doubt they were told all about this matter in the lectures, but it made little impression on their minds and was not supplemented by drilling upon it in the infirmary.

Most of the graduates use gilling twine as a ligature in applying the rubber-dam. Are they instructed to use this in the infirmary, and do the professors use it in their private practice? In my opinion, at this day none but butchers or ignoramuses use gilling twine.

Not only is the graduate generally unskillful in putting on the rubber-dam, which may be the result of want of capacity or of practice, but he generally does not know how to go to work to do it, which shows want of instruction or drilling. He is not simply a bungler at it; if he were, we would have charity, as he might not be at fault. He is ignorant, and the fault lies at the door of the infirmary and the college which runs it in such a shameful and niggardly manner.

Are undercuts, deep at that, and with no dentine underlying the enamel, generally considered necessary to hold in the gold? Do the professors teach this in their lectures and the demonstrators allow it to pass unchallenged? Surely it must be, for I find it advocated in the oral examination and practiced at the demonstration. May it be that the lack of efficient oversight in the infirmary is also responsible for this error? The student, with his lack of skill, naturally takes the short cut to overcome a difficulty, unless constantly advised, helped, encouraged, and stimulated to adopt the better course by the willing, competent, ever-present demonstrator. I tell you, gentlemen, that the average graduate is a bungler, and the main fault is with the infirmary.

I could keep on, hour after hour, in this strain, but I will forbear, and only add to my dear old friends, whom I honor for their many years of devotion to dental education, and whom none hold in higher esteem than myself for what they have done in the past and what I know they are willing to do in the future, make a reform, at least in the infirmary, and spare us the necessity, under our oaths, of pronouncing your work not well done.

WHAT IS TRUTH CONCERNING SEPSIS AND ASEPSIS?

BY R. M. SANGER, D.D.S., EAST ORANGE, N. J.

(Read before the New York Odontological Society, November 19, 1889.)

Mr. President and Gentlemen: We have a practical interest in the development, treatment, and prevention of septic conditions.

No other field of investigation is being so closely scanned by the pathologist as this. Laboratories are full of cultures of all kinds, turning them for the time being into microscopical menageries. Whole hecatombs of bacterial life are immolated daily on the altar of science. The patient and uncomplaining frog aids and abets the mimic warfare between microscopic forms, submitting to the graft of anthrax and quietly abiding the result, while the investigator gleefully watches the struggle and sees the victorious phagocyte swallow the conquered bacteria. The field of the microscope has been turned into the arena of strife, where gladiatorial shows are conducted for the gratification of a single witness, himself unknown to the combatants, while the list of champions is rearranged as one or another proves his powers. Graded doses of the most powerful poisons are administered to bacteria, and their effects carefully watched to see whether the victim will succumb or whether a more potent dose is required.

But by these means the truth is being finally brought to light, and practical results of the best kind have been obtained. In this field has surgery won its greatest triumphs, and operations are now done with good results where a few years ago death would have been considered certain. The sum of suffering already relieved is beyond computation, and living witnesses in thousands testify to the great advance in saving life.

Meantime, the domain of investigation has been itself turned into a field of battle where conflicting opinions rush together in combat. The strife grows with every month that passes. Some would make the phagocyte an armed warrior rushing with joy to the conflict, while others emphatically declare that it is merely a microscopic jackal feeding on dead bodies. There are those who ridicule the great importance given to these organisms. To them the cold facts of chemistry are sufficient. The adherents of these various opinions are as vigorous in attack and defense as the minute organisms that are the subjects of their discussion.

The dental surgeon cannot be indifferent in this matter. He has seen artificial dentures brought to a high state of perfection, while the list of available material for fillings seems well-nigh complete. His greatest advance is now to be made in saving those teeth which have hitherto been condemned without hesitation to the forceps. Their salvation is closely connected with the prevention of sepsis or its removal, and it is extremely important to know how this can be accomplished. The solution of the septic puzzle will open a new field of usefulness, and the odium of the forceps be almost abolished.

In discussing this subject the natural order is to notice first the various opinions on the production of sepsis. They may be classed under two main divisions: the chemical, and the germ theory in its different aspects.

The chemical theory of suppuration has been advanced on the same lines as the theory of the chemico-vital processes. The changes occurring during digestion from the action of ptyaline in the saliva, of pepsin in the gastric juice, and of pancreatine in the intestinal secretions are familiar instances of the chemical agency by which it is claimed that vital formative actions are continued. So also it is maintained that chemical processes in dead organic matter can produce putrefactive results, and that the step from one to the other is a short one.

The germ theory has found many enthusiastic advocates, but while they all agree in the necessity of the germ in the production of the septic condition, there are many phases of belief prevalent among them. The most important of these are the following:

1. That the presence of minute organisms in septic states is accidental or incidental, and that it is only in connection with too great numbers, or their presence in tissues of low vitality, that damage results.

2. That they act as destructive parasites consuming the oxygen of the tissues and thus leading to sepsis by fermentation. Pasteur inclines to this view, giving as his definition of fermentation, "life without free oxygen."

3. That by translation from one living body to another they undergo morbid changes and become destructive to the body by which they have been received. Beale is the author of this view, and is almost alone in its advocacy.

4. Virchow looks upon them as poison-producers, the ferment produced by them being the specific morbid material; and closely allied to this view is that which considers their death with resulting ptomaïnes as the active cause of sepsis.

5. Still another view is that these organisms are simply carriers of poison, possibly in some way increasing the power of the poison by their own vitality.

This résumé of the various opinions of the part played by germs in sepsis would be incomplete without some account of the views of Metschnikoff. They are so graphic and attractive that we will take a few moments to quote from Dr. Osler a short but fairly complete statement of his ideas:

"The theory elaborated by Metschnikoff had been hinted at by many previous observers, but to him is undoubtedly due the credit of bringing it into prominence, and of doing in connection with it a very large amount of interesting work. . . . He likened specific inflammation to a warfare in which the invading army is represented by micro-organisms, and the resisting forces by the leucocytes. Even in details the analogy was maintained. Notice of the arrival of the invaders was telegraphed, so to speak, by the vaso-motor nerves; the line of communication, the avenues of mobilization, were represented by the blood-vessels. The aim of the invader is to secure the territory, to multiply rapidly, to live at the expense of the host, and to manufacture and circulate substances injurious to him. The aim of the resisting forces is to encircle the enemy, inclose him, digest him, and render him inert in battle. Many phagocytes die in the process, and, if in large numbers, the heaps of the slain represent pus; an abscess is a battle-ground densely packed with dead bodies."

Around these views of the origin of sepsis cluster all the various opinions regarding its prevention and removal. The practical worker, who is unable to prosecute original investigations, is confused by the multitude of counselors in this matter, and not unfrequently finds his clinical experience apparently at variance with all these opinions, whereby his faith in scientific theories is somewhat clouded by his clinical empiricism. Under these circumstances it is not to be wondered at if he cries out with one of old, though in a different sense, What is truth? We do not profess to have found the true answer to this question, but it certainly will not be amiss for a busy practitioner seeking for the answer to narrate the results of his inquiry.

The first question awaiting solution in order to reach the final answer is, What relation do micro-organisms have to the septic condition? Is their presence necessary to the establishment of sepsis, and does their absence mean asepsis? In view of the great stress laid on their destruction by certain agents in cultures made for determining the antiseptic properties of various substances, the answer to this question is important. Dr. Black has given tables showing the comparative value of a number of professed antiseptics, which are based entirely on the supposition that the destruction of the germ is the essential need in bringing about a condition of asepsis. If this ground will not stand, then the tables are utterly useless.

Now, what does the clinical investigator find to be the record on this subject? He reads these widely divergent statements:

1. That bacteria have been found under Lister antiseptic dressings without suppuration. By Lister antiseptic dressings is probably meant carbolic acid. The trend of this statement is evident. Bacteria may be present without causing sepsis. The natural query then is, Why is it considered a necessity that the germ should be destroyed in maintaining asepsis? and what kind of inhibition is that which has no connection with the development of the germ? Either the bacteria are of no importance in connection with suppuration, or carbolic acid is antiseptic even though it is not germicidal.

2. The complement of this first statement is found in the claim made by several observers, that suppuration has been produced without the presence of bacteria. Various substances, such as nitrate of mercury, corrosive sublimate, and alkaloids included under the term ptomaïnes, have been used in producing abscess in which there is no micro-organism.

Bacteria without suppuration have been found under Lister dressings, and abscesses without bacteria have been produced by chemical substances. We are rapidly becoming involved in the mazes of a labyrinth.

At this point, however, another set of observers come to the rescue. They tell us that it is not the germ necessarily, but the nitrogenous matters commonly called ptomaïnes, that are the medium of contagion. They even tell us that when the germs are present they act only through this medium, and not of themselves. And, furthermore, these substances, they say, of which cadaverine is an example, may be produced by purely chemical methods. In this way they endeavor to clear away the mists gathering over us when we consider that suppuration may occur when no germs are present and germs may be present without suppuration. But, practically, we are met with this query, How can we know that these ptomaïnes are absent from the tissue we are so carefully guarding against septic infection? and what kind of inhibition is it which chokes the poor bacteria but allows the ptomaïne to do its deadly work? or what is the value of investigation to determine the antiseptic power of substances by their ability to destroy bacteria?

The practical worker, without the chance to investigate for himself, and compelled by the circumstances to credit all observers until they are positively shown to be wrong, finds himself still wandering in the intricacies of the labyrinth.

But the end is not yet. We are told that in all probability the condition of the tissues upon which the germs are to develop or the ptomaïne to attack determines the result in sepsis or asepsis. A low vitality (general or local), inflammation (simple or traumatic), and other conditions may so alter the soil in which the septic material is deposited that suppuration may follow where the absence of the unfavorable conditions would almost insure asepsis. The conclusion to which we are driven is apparent. If local conditions in living tissues are responsible for results differing as widely as sepsis or asepsis, what value have investigations to determine the antiseptic powers of various substances when they are carried on entirely in culture-media? From a clinical stand-point we can understand the meaning of this statement about local or general conditions in the patient. In our own practice we have patients who will almost certainly develop suppuration in a tooth that is devitalized; while in others we can handle pulpless teeth almost with impunity because in them the suppurative process is started with great difficulty.

These questions have not been asked in a captious or satirical spirit, but honestly. We have already said that from these investigations will come the truth, but in asking at this stage of the inquiry, What is truth? these questions are not misplaced. Leaving now this view of the subject, we will continue the search for truth in the treatment of established septic conditions. The question, therefore, now is not how we can prevent suppuration, but how can we be rid of it when already existing?

It must be confessed that the mass of testimony is that the germ must be either destroyed or prevented from further development. But allowing the great importance of this statement, we still are compelled to ask some questions bearing upon the means by which it may be destroyed or inhibited.

Is perfect cleanliness sufficient to remove sepsis? This is a question of great importance, requiring the more careful consideration because the "antiseptic" and "germicide" have been given so much prominence. Can we fall short of the strictest rule of the surgeon in the care of his instruments and hold ourselves guiltless because we use mercury, iodoform, or oils to keep the bacteria at bay? Dr. J. B. Roberts, of Philadelphia, says concerning this question of cleanliness, "With all reverence I declare that the clean hand is more necessary to the successful surgeon than the pure heart." In regard to his own practice in surgery, he says, "My first endeavor is to obtain absolute cleanliness of patient, operator, assistants, instruments, and dressings; and then, on account of the difficulty of attaining perfection in this regard, to employ, as a rule, chemical antiseptics as an additional safeguard. There is no question in my mind that cleanliness is the more important element in my success."

In connection with a statement like this it may be asked, with all respect for those who are investigating germs in culture-media, whether a suppurating surface cannot be cleared from all septic material by washing with hot water repeatedly. More particularly it may be asked whether a root-canal cannot be freed from all germs by thorough cleansing as well as by the most powerful chemical antiseptic. If cleanliness is considered of such great importance by the general surgeon, can we neglect it? Are we justified in attempting to clean a suppurating root-canal by chemical antiseptics to the exclusion of careful and thorough washing? And if we do remove the cause of the suppuration by careful cleansings, what further use have we for the chemical? Is it simply as an additional safeguard? These are questions we must answer to reach the truth.

Another question of importance is this: If an inflammatory condition is present as the basis of the suppuration, will removal of the inflammation be sufficient to stop the further progress of the suppuration? Clinically we see cases of this kind which we have treated, as we supposed, by antiseptics. A favorable result has been obtained, and we have rested comfortably in the belief that we have killed the pestiferous bacteria, for the suppuration has come to an end. Then the serenity of our conviction is rudely disturbed by the demonstration that our pet antiseptic is of no use at all to kill or even corral a microbe. The demonstration cannot be denied, and yet we obtained the result desired. What then? Do we throw the antiseptic aside and have no more of it? No; on the contrary, we follow Galileo in spirit, and while recanting in words our belief in the antiseptic still say, under our breath, it works well, nevertheless. Where is the explanation of this puzzle? Is it to be found in the action of our antiseptic on the inflammatory condition? This is a question awaiting answer that we may discover the truth.

Many are the questions that might be asked when we consider the subject of chemical antisepsis. The conflict of opinion on this phase of the septic puzzle has been already referred to, and far be it from one not an original investigator to join in such a fray. But though we decline to engage in the conflict as principals, we may be allowed the privilege of inquiry to find the truth. This will lead us to notice the discrepancy between the laboratory and the clinic as to results obtained from substances presumed to be antiseptic by the latter and denied such qualities by the former.

The divergence between the two is probably greater over iodoform than any other drug, and curiosity, if no other motive, would lead us to search out the cause of the difference and to bring about unanimity. It seems certain that iodoform is not a germicide, and in so far as its poisonous effects on bacteria are concerned we must admit that it is not sufficient to remove them or to act directly upon them as a poison.

But when we have made this confession we must also say that it does in some way affect the suppurative process in living tissues. Clinical experience has established this beyond dispute. How does it accomplish this work when it will not destroy the germ? There is one direction in which an explanation is possible, and in giving this I will close this paper, already too long, seeing that it deals so largely in interrogation. The following points are taken from the "Annual of the Medical Sciences" for 1889, in a summary of a paper by Behring on the subject of cadaverine, iodoform, and suppuration. The results are summarized thus:

1. Cadaverine can produce pus without the co-operation of micro-organisms.

2. Cadaverine and iodoform affect each other in such a manner that both substances undergo chemical transformation.

3. Through the chemical effect of iodoform upon cadaverine the latter loses its pus-producing power.

4. With the example of cadaverine we can perceive how iodoform may hinder suppuration without exerting a disinfecting influence or arrest of development upon pus bacteria.

This statement is one of a large number that have promised the solution of the septic mystery, but as so many have already met an untimely end too much hope should not be placed in it. Nevertheless, this should be said, that where differences exist between the clinic and the laboratory the latter must be secondary to the former and agree with it in conclusions. Bacteria may be said to have all the conditions in culture-media favorable to them, without opposition; but in the living tissue they are confronted from the start by that principle which is at enmity with them, and which we call "life."

THE CURTIS BRIDGE.

BY G. L. CURTIS, M.D., D.D.S., SYRACUSE, N. Y.

THE principal uses of this bridge will be in cases where the pier teeth do not stand parallel with each other, and it is desirable to attach a bridge without cutting off one or more of the teeth or dressing down the sides of the teeth until the surfaces next to the bridge become parallel, as is necessary when the Low or any permanent bridge is adopted. Where the pier-teeth in these positions are ground away until they will admit the adjustment of a permanent bridge, much pain is experienced by the patient and the chances of exposing the pulp are greatly increased. The new bridge not only diminishes the liability to pain, but also of the death of the pulp from thermal shock, which is besides a source of great annoyance when tightly-fitting crowns are used on teeth where the dentine has been exposed, as can readily be understood.

By this method it is only necessary to grind away the surfaces of the tooth until a crown can be nicely adjusted. It will be observed that very little of the tooth is sacrificed, and that this bridge can be easily attached to teeth standing in any position in the arch without regard to their relations to each other. Cap crowns are first fitted to the teeth between which the bridge is to be placed, and the crown-cusps correctly articulated. An impression is then obtained by any of the ordinary methods. I prefer placing the plaster about the crowns, filling the space between them and extending above the masticating surfaces. The mouth should then be closed to get a correct articulation, and held until the plaster becomes sufficiently hard to be readily broken. The jaws are then opened, and the plaster and crowns removed and put together and held by means of wax until the model is cast in plaster. Then by placing it in an articulator the articulation is obtained and the impression carefully picked away, leaving the cast and articulation undisturbed. The bridge is now constructed by taking the suitable porcelain facings, grinding and backing them until the space is properly filled. The solid gold cusps are now ground to articulate with the antagonizing teeth and attached to the facings by means of wax. Then remove and incase the bridge in marble-dust and plaster, and solder the cusps to the backings, using only sufficient solder to prevent the movement of the cusps. The sockets like A, Fig. 1, which are made of thin gold, are then placed in position and held by means of *fluxed* wax, and the entire piece again incased as before, so that the ends of the sockets project beyond the cusp-surface of the bridge and are imbedded in the plaster, which holds them in position. The wax is melted out and the sockets soldered into place. After cooling, the projecting parts of the sockets

FIG. 1.

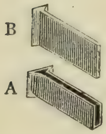
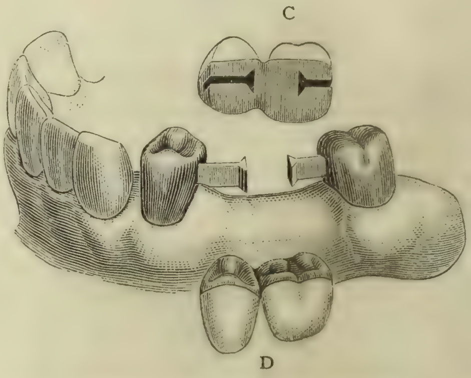


FIG. 2.



are cut away until the bridge fits perfectly between the crowns, and the soldered surface is ground away to the proper fullness, and the whole piece rendered quite smooth or ready for polishing (C, Fig. 2). Arms like B, Fig. 1, are now placed into the sockets and cut off until a perfect adjustment with the crown is obtained. It will be found that the arms are considerably wider than the sockets are deep, allowing them to project one-sixteenth of an inch or more. Secure the bridge in position by a drop of wax at the junction of the porcelain surface and the cast, then varnish the palatal surface of the cast and pour soft plaster and marble-dust over this surface until it is on a level with the masticating surface, and allow it to harden. Then carefully remove the bridge and replace the arms in position as marked in the plaster, and retain them by means of additional plaster, or by steel springs, and solder them to the crowns, first placing in the joint sufficient fluxed wax so that in the process of soldering the arms will be perfectly united to the crown, which requires a very small quantity of solder. The case is now ready to finish.

FIG. 3.

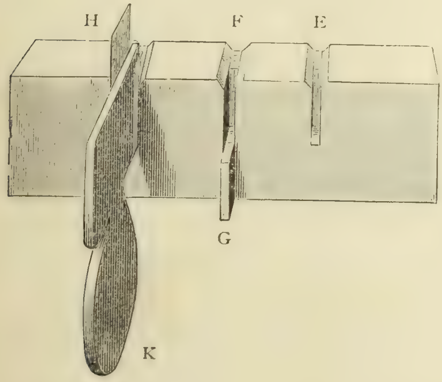


FIG. 4.

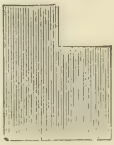


FIG. 5.

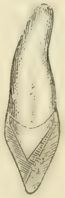
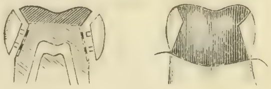


FIG. 6.



If the adjustment of arm and socket is perfect, the structure will be found to fit so snugly that it is only with considerable effort that the bridge can be removed. With everything in readiness for cementing, the crowns are quickly forced into position, the bridge carried to place, and the cement allowed to harden.

Should there be necessary in the articulation any alteration that cannot be met by grinding off the cusps of the antagonizing teeth, the bridge can readily be removed without disturbing the crowns.

The arm B, Fig. 1, is made of a strip of clasp-metal, No. 16 gauge in thickness, and of any desired width or length. The strip is placed in a slot like E, Fig. 3, and the projecting end hammered to form a solid head as shown. A longer or shorter arm may be formed in the slot F, wherein the adjustable limit, G, may be set to limit the length of the arm while the hammered head is being formed. A piece of 20-carat gold plate, or preferably clasp-metal No. 33 gauge, is cut to the size and shape of Fig. 4, and by means of a former, K, Fig. 3, is forced into a suitable slot. The place of the former K is then taken by the arm B, Fig. 1, and the part H, Fig. 3, bent and delicately hammered over the head of the arm. The socket so formed is then removed, soldered from the outside, and finished as at A, to exactly fit the arm B, Fig. 1.

It is obvious by recurring to Fig. 2 that the bridge C, D may be readily detached for the purposes of cleansing or repair.

There is not infrequent occasion for putting caps with porcelain facings on living teeth. To do this I cut any one of the oral teeth to a sharp wedge-shape, fit a thin gold cap, select a thin facing, punch the cap and solder the pins on the inside of the cap, fill the cap and cover the facing with plaster and marble-dust, and contour the back with solder. Fig. 5 illustrates the operation after the cap-facing has been cemented over the crown. Fig. 6 shows in section and perspective a living molar gold-capped, having solid gold cusps, and provided with porcelain facings on its buccal and lingual sides.

COMPATIBILITY OF FILLING-MATERIAL WITH TOOTH-BONE.

BY MAX GREENBAUM.

(Read before the "D. D. S." Society, Philadelphia Dental College.)

THE demonstration of the relations existing between filling-materials and tooth-structure, the importance of this consideration governing the choice, in fact prescribing the material or materials to be used in each case of filling teeth, is of comparatively recent date. Its presentation was made by Dr. Palmer, and its verity has given to the profession one of the most reliable basal theories for tooth salvation. The remarkable work done in connection with dental caries by Dr. Miller offers a foundation for the electro-chemical theory, and as that work has now a universal acceptation for scientific correctness, the basis of the Palmer theory is intact.

The following is a succinct expression of its facts and bearings:

A fundamental fact in operative dentistry is that the introduction of any filling-material which is a good conductor results in the presence of a factor of electrical disturbance, as certainly as does the insertion of a copper plate in a cell containing the other elements necessary to produce a current of electricity. It is obvious that this must be contrary to all conditions governing the saving of the tooth.

A knowledge of this would greatly aid the operator in obtaining favorable results by the judicious use and application of the best material. It is an error to claim superiority for any one filling-material in general practice. Each subserves certain purposes, and each for such purposes is the best. The problem is, what are the conditions and circumstances which indicate their use?

Some teeth when filled with gold maintain their integrity for a lifetime; but disadvantageous local and systemic conditions generally lead to secondary decay. Beyond this there are two causes of secondary decay which subject the most perfect tooth to destructive agencies. These are, first, a deficiency in the inorganic composition of the dentine, which deficiency modifies it as a conductor; and second, defective manipulation or shrinkage of material, which allows the entrance of moisture between the filling and the walls of the cavity.

It is a settled fact, as before stated, that the action of the acids (the result of fermentation) upon the dentine and other parts of the tooth is the most active agent in the production of dental caries. From this are derived the conclusions relating to the action established by the insertion of metallic fillings. These are, that through the decomposition of food and the organic elements of tooth-structure there is a current generated concomitant with which there is a new formation of acids. In other words, there is an increase of acids beyond that which would result from non-conductive fillings. This removes the inorganic or non-conducting elements, and the remaining organic matter, being a conductor, naturally permits increased localized currents, which accelerate acid action upon the dentine and cause more rapid decay. Thus the presence of a conductive filling-material maintains a continued acid action, and the result is an electro-chemical current, as is shown upon the removal of leaky gold fillings.

What is denominated secondary decay differs somewhat from primary decay, which is the result of the chemical action between acids and the lime-salts; but the acid is the product of fermentation and of organisms. In secondary decay the action is the same, but the decay, when once established, is expedited by the conductivity of a negative element. If we take pieces of zinc and silver and place them in the mouth and separate them slightly with the tongue, we have constructed a cell, established a current, and decomposed the saliva. This is similar to the more elaborate battery. In the mouth the tooth-structure is the positive element, as is the zinc in the battery, and any filling-material which is a conductor is the negative. We consider it settled that the first stage of decay is a disintegration of the lime-salts of teeth, due to the presence of an acid. We know that where food can find lodgment, if only for a short time, in fissures and pockets, acids are freely formed. Now gold placed in contact with such acids becomes increasedly polarized; decomposition of the fluids and food-substance is the result, an additional amount of acids the consequence. We speak of gold comparatively, because it permits of no oxidization and is the best conductor, therefore it is the most deleterious. Other metallic fillings are considered unfavorably in degree as they oxidize, and according to their conductivity, thus permitting the products of decomposition to act upon them, thereby lessening the disintegration of tooth-structure.

Some amalgam fillings, for illustration, possessing these qualities more markedly, invite the force upon themselves, forming with the sulphuretted hydrogen which is constantly brought in contact with them in the mouth sulphide of silver, which is deposited upon the dentine, and so we have an amalgam filling resting against sulphide of silver. The sulphide refills the decalcified structure and thus forms a substance of the same polarity as the filling. Hence all further disturbance ceases.

By polarity we signify the unlike qualities, positive and negative, expressed by the two ends of a metal suspended in a fluid. Metals invariably assume this condition when exposed to moisture, as is illustrated by a piece of iron with one end resting upon the ground and exposed to the atmosphere. All metallic fillings in the mouth are subjected to these conditions. But there are relations which materially modify the action of the disturbance produced, such as dense teeth and normal secretions, also combinations of filling-materials. Gold, used in conjunction with tin as a substratum, and the different amalgams all impart to poorly calcified dentine antiseptic properties, as is corroborated by the discoloration of the tin or amalgam. Gold, on the other hand, is subjected to no change, and is therefore in no wise a good filling-material for cavities in teeth of soft or highly organic structure.

From the foregoing facts is deduced the following:

All substances have a molecular motion, an equivalent to a static force, and this is termed their "potential." Now when two substances of different potential are placed in opposition with each other they produce "clash," and just in the degree of the difference in their potential will be the clash.

As before said, the conditions in the mouth are similar to those of a battery, the tooth-structure being the positive element, as is the zinc in a battery, and in like manner to the disintegration of the zinc does the tooth-structure become disintegrated or corroded. Therefore we deduce that in proportion to the difference of potential between tooth-structure and filling-material, or in proportion as they clash, so will the positive element fail quickly. Thus it is soft teeth with gold plugs fail most readily.

Dentistry is largely the outcome of empiricism,—first practice, then facts,—and so here, as Prof. Flagg writes, "It is now more than twenty years since I commenced the use of tin foil, amalgam, and gutta-percha as guard-fillings at the cervical walls; not because they were soft and could be more perfectly adapted, but because I had noticed that fillings made from these materials permitted occurrence of decay less promptly than did gold, even when worked by the best manipulators of the day." What was then empiricism is now science. In teeth which contain vital pulps the exudation from the pulp is constantly brought in contact with the filling and an electrical disturbance is the consequence, and as a result we have the disintegration of the positive element, which in degree depends upon the difference in potential between the filling-material and tooth-structure. The potential of gold is far different from that of tooth-structure, as is indicated by the rapid failure of fillings, especially in soft teeth. Inversely, the greater equality existing in potential between amalgams and tooth-structure and gutta-percha and tooth-structure is indicated by the comparative freedom from decay which results when the cavities in soft teeth are filled with these materials. Likewise is proven the positivity of the zinc plastics, owing to their disintegration when used as filling-materials. Therefore they are denied the performance of *guard duty*.

From this exposition of the relations existing between filling-materials and tooth-structure will be seen the reasons why soft, frail teeth should not be filled with gold, and why those filled with gold in which the cavity extends to the cervical margin should be protected with a "guard." It also explains the wisdom of lining cavities or insulating the fillings. This application of the laws referred to has given years of existence to teeth which otherwise would have been lost. The following from "Plastics and Plastic Fillings" are the natural deductions from the positions assumed:

1. Gold maintains the greatest difference in potential to tooth-structure.
2. After gold the cervical margin is susceptible to tin and silver amalgams.
3. Under fillings of tin foil, or silver, tin, and copper amalgams.
4. Under gutta-percha.

Upon the preceding facts rests the success of filling-operations.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular monthly meeting in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street, on Tuesday evening, November 19, 1889.

The president, Dr. J. Morgan Howe, in the chair.

The President. Gentlemen, I take pleasure in introducing to you Dr. R. M. Sanger, of Orange, New Jersey, who is our first essayist this evening.

R. M. Sanger, D.D.S., then read a paper entitled "What is Truth concerning Sepsis and Asepsis?" *

The President. Gentlemen, the subject of this very excellent and suggestive paper is before you for discussion.

Discussion.

Dr. W. H. Dwinelle. I feel as though I ought to be the last to speak to-night, for I see those around me who are better qualified to do so. The paper, as you have already observed, is an exceedingly interesting one. Our worthy friend has gone off into new fields comparatively, and that is the reason why he has surrounded the subject with so many interrogations, a series of questions, but I think he has given us the best résumé of the whole matter that I have ever listened to. I feel grateful to him because he has taken pains to gather so much material to present to us to-night. It seems to me this whole matter from beginning to end is *speculative;* so many diverse and contradictory views have been expressed. One says a certain antiseptic will produce a certain result, while another says that by his own personal observation and experiment it produces no result at all. The question is certainly an open one to a very large extent, and I think that like all new sciences and new discoveries it will take a great deal of time yet before we shall settle down to fixed principles and accepted doctrine in reference to the matter.

I was rather amused at the varied and contradictory statements and theories that have been introduced, especially where Metschnikoff compared it to one army battling with another, reminding one of the "Battle of the Ants," as pictured to us in our studies in entomology. Here, as there, we have the antagonism, the contest, the charge, the overthrow, and, for aught dull ears may know, the bugle-sound of victory! He has given way to his fancy and has really given us some entertaining views of the matter, which I do not think, however, are entirely acceptable; still it is very pleasant, and we may as well speculate upon this subject as we speculate upon the inhabitants of the moon. We are perfectly safe in entertaining these new theories, because we know we cannot be contradicted. Nevertheless, it is an exceedingly interesting subject, especially to our profession. If there are bacteria and micro-organisms, etc., under different names and titles, we have as much to do with it as any other class of people, —as much as the medical profession, if not more. So our inquiries in this direction should be earnest; and I feel again like expressing my obligation to the writer of the paper to-night, for he has thrown probably as much light upon the subject as ever has been by anyone preceding him. He has given us both sides. I think it was St. Paul who said we must hear both sides and then agree. We have not only had both sides, but a multiplicity of sides. It reminds me of a debate they had down East somewhere; they were discussing a question before the house as to what is the difference between the Bridge of Sighs and the size of the bridge. They argued the matter *pro* and *con*, it was discussed at great length, and finally the president was called upon for a decision, when he said that he had listened with great satisfaction and had been exceedingly entertained by the debate, and after revolving the matter over in his mind he had concluded, upon mature deliberation, that upon the whole *he thought it was!* The question is still open: What is truth concerning sepsis and asepsis? We are searching after truth as much as any other people; I think the essayist has given us a lead by which we may ultimately arrive at solid, recognized, and established truth; but we have not got there yet. The way has been opened to us; I see before me a very pleasant and interesting vista in this line of investigation. I hope we will not rest here, but that our worthy friend will continue to give us his aid in the discussions that may come out of this to-night. Dr. Atkinson is here; I hope he will entertain us.

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* Dr. Sanger's paper will be found on page 103 of the current number.—Ed. Dental Cosmos.

Dr. W. H. Atkinson. When I was a little boy I was not particularly in love with a bugaboo, and if I deprecate anything it is the standard bugaboo of seeking after appreciation in the pronouncement of truth. It has been suggested that we are in deep water; but nevertheless we are there, and these questions have been sprung upon us. We shall have to make a better classification than we have yet had to arrive at a demonstration of how septic conditions may be converted into aseptic and healthy states of nutrient activity; for it is by the awakening and engagement of the bonds of energy of the prime elements that we are enabled to grasp a concept of the forms and differences within the tissue at all. Our nominations are so badly mixed, as indicated in the paper and in the remarks following it, that it is almost a waste of time to attempt to make a syllabus that shall be profitable on the basis that we now have. All combinations that we are acquainted with have been arranged under two heads of so-called principles; they say chemical affinities and limitations preside over one class of bodies, and that vital power and the measure of its presence constitute the construction and maintenance and destruction of what we call living bodies. The mistake is that we take it upon us to restate our propositions and nominate them explanations.

Every body that is classifiable is made up of elements, and those elements have among themselves the capacity to be united to other elements, or a potency to take on an activity by reason of the presence of other elements; and, learned as we have accounted ourselves in chemical destructions, we have failed to see the limitation in the measure of the awakening and combining powers that constitute the various bodies with which we deal; and as bacteriologists our chief difficulty has been our inability to simplify the classifications that have been given to us so that anyone outside of the immediate coterie that have been engaged in the investigation of certain cultures would be able to recognize what they were. We have as yet no means of recognizing what they are, any more than we have what we thought were the coarser forms in embryological investigation, where we find the germ dividing into three embryonal sheets made up of indifferent bodies that have been called proto-vertebræ, recognizable as such according to the position in which they are found, and classifiable as body walls, visceral walls, and splanchnic walls of mammalian or molluscan bodies.

We might make a great show of learning by running on in the mere imaginative playfulness of our minds without making much progress.

I feel that it is a matter for rejoicing that such subjects are attacked and dwelt upon at all among our brethren. I feel as Dr. Dwinelle did, like complimenting Dr. Sanger upon his faithful work and the clearness with which he has presented what other men have said; I do not know as I feel like commending his modesty in dodging the responsibility and not taking a position. I often say to my boys that I would a great deal rather they would tell the blackest lies out of jail than say nothing, because the lies so presented might suggest a point upon which we might make an attack, and thus stir our interest, intellect, and affection so as to get some grasp of what we are trying to comprehend and formulate. We need to go back to understand the difference between food, poison, and remedy, and study the specific conditions that make it legitimate for us to nominate any substance that is capable of being taken into a functional body as a food, a poison, or a remedy. We will find it is not the individual body that we have to deal with, for any one of the bodies will, under certain circumstances of the feeding bodies, take the rôle of either food, poison, or remedy; that is to say, supporting, disturbing, or balancing power. Long ago it was said that what was one man's food was another's poison; and supposing that we call these homencules, or little men, and that they have, as we have, their fancies and idiosyncrasies, and a disposition to dance with or refuse to dance with the others in a cotillon of functional activity, by reason of this willingness or unwillingness we will find there will be a great deal of thought interjected into our investigations, so that we shall be in doubt when we shall attempt to asepticize an abscess by injecting H_2O_2 and get a nice beautiful presentment of whipped cream, so that we will be asking ourselves how is it these bubbles are formed, from whence are they and what is their business? Some will tell us they are supporters of combustion, and at once jump at the conclusion that they must be oxygen; but when they find that the breaking of the larger bubbles will put out a live coal instead of supporting combustion, and arrest the progress of burning, what do we do then? We have to fall back on the supposition, which is the only rational supposition, that one that is against function is against activity and does not support the changes that we nominate life, is probably CO_2. A difficulty that we labor under is the use of this term life. We have action where there is sense of being in life, and we have microbes that are said to be anaërobic: they do not need air in order to live. They are merely grubs; they are not bees. There is no demonstration whereby we can show a justification of the interpretation that we put upon the various appearances that we say are indicative of bodies being alive or dead. There is the great difficulty. How do bacteriologists justify their statement that there is an end of all action that shall be called combining or separating in these bodies, or that these microbes are not simply asleep when they call them dead? You see where the same process of the mind would lead us endlessly to repeat ourselves, making and projecting a great many questions without arriving at anything that is sufficiently established for us to say that we really do know what cleanliness means. When we know what the old saying that cleanliness is akin to godliness means we may know what absolute asepsis means; but nobody can yet tell us what are the conditions of normal pathological function as compared with that which is minified, crippled, or destroyed function.

The President. It is very natural that one should like the presentation of a subject in such a way as to coincide somewhat with his own views, so far as one has views; so for that and other reasons I feel called upon to say that I like this paper very much. The questions here raised have been suggested to my own mind, and not very long ago I alluded to somewhat similar ones in the discussion of a paper read by Dr. Ormiston before this society; so I am to-night rather prompted to relate an incident that has recently occurred. Inflammation was defined, some years ago, to be a disturbance of nutrition, and suppuration was the unfavorable termination of the inflammatory process; but recently that view of suppuration has been lost sight of to a great extent, and the whole trend of recent thought has been directed to the origin of suppuration through the influence of microbes; hence the apparent importance of the question, what will destroy microbes? I have been in the habit for some years of dressing root-canals, as soon as opened, with iodoform in solution. Such a tooth was opened for the purpose of treatment in my office by my assistant, Dr. Rice, about a week ago. Iodoform was introduced in solution, and stopped in with a gutta-percha stopping. It remained two or three days and the dressing was removed. There was need to bleach the tooth as well as to dress the canal, and although I have been very much impressed with the irritating properties of peroxide of hydrogen, and have recorded that impression in dental meetings, I so far departed from my usual course of procedure as to ask Dr. Rice to wash that tooth out with peroxide of hydrogen, thinking to accomplish something of the bleaching operation at the same time,—that the pyogenic condition was antagonized by the agent that was so highly prized by some. The result was inflammation within twenty-four hours, and that inflammation has been uncontrollable, and has gone on probably to suppuration. I do not know positively. The young man's face is swollen and he has not returned to my office. Iodoform perfectly controlled the condition that I regarded as dangerous, but washing out the canal with an agent which is supposed to be germicidal in its action apparently created a chemical irritation of the tissues beyond the end of the root, and that irritation went on to inflammation. The suggestion that arises in my mind from such an experience coincides with the questions that have been raised by Dr. Sanger. I must say that I am inclined to give a great deal of credence to the view that has been taken by Metschnikoff. I rather lean to the support of a view which has as its basis the idea that the resistance to septic conditions is to be found in the vital condition of the tissues ; whether they are represented in such a fanciful way as that which has been presented as Metschnikoff's view or not, it seems to explain more satisfactorily my own experiences than any other. I saw recently in the *Boston Medical and Surgical Reporter* a statement that attracted my attention as being germane to this subject. The statement is made that Mr. Steinhaus, of Varsovia, is reported to have read a paper before the French Association for the Advancement of Science, in which he combats the notion that without microbes there can be no suppuration. He made two hundred and forty-five experiments upon dogs, cats, guinea-pigs, and hares with various sterilized irritants, and claims that the results proved that suppuration may be produced by sterilized chemical agents without microbes. He also cited the experiments of Straus, and of Bary and Christmas, as giving like results.

Dr. S. E. Davenport. As Dr. Rice is in the room, it would please me much if he would give what additional information he can concerning the tooth to which our president has referred. I would like also to say that I do not for a moment think the case proven, that even in that tooth the peroxide of hydrogen was the irritant which caused the present swollen condition of the surrounding tissues.

Dr. Atkinson. Is it known whether there was any pain; and, if so, did the pain cease when the swelling began?

Dr. Rice. There was pain after the swelling commenced. I saw the tooth, and the gum above it was red and inflamed. The tooth was very loose, and sore to the touch.

Dr. Atkinson. I am always glad to see the surrounding tissues swollen under such circumstances.

Dr. Rice. After opening it, seeing the patient a second time, and carefully removing the disintegrated tissue from the part of the canal having the larger caliber, I then carried the peroxide of hydrogen up with a piece of cotton on a fine broach, twisting it around and pulling it out several times. I left cotton and peroxide of hydrogen in the canal. There was no really thorough cleansing of the canal. I do not think any disintegrated tissue was forced through the apex of the root.

A voice. What was the age of the patient?

Dr. Rice. About thirteen or fourteen years. It was a left superior central, broken off so near the pulp that it had died.

A voice. How long had it been dead?

Dr. Rice. I think about a year.

The President. The opening was made for the purpose of removing the dead pulp, which previously had not been exposed. My experience is that the opening of such teeth is attended with danger, and that iodoform has been an efficient prophylactic, without irritating qualities. Now, one of the authorities quoted by Dr. Sanger states that iodoform acts chemically so as to change that product of the decomposition of animal tissues called cadaverine. Whether that is the reason of the facts of experience or not, I am unprepared to say. The use of peroxide of hydrogen has been followed by severe irritation in a number of my cases, so that I had previously been led to connect them as cause and effect, and the incident related has a bearing only in that light.

Dr. Davenport. From what Dr. Rice has said of the method employed, I think some of the dead pulp-structure may possibly have been forced through the apex, as he intimates that the canal was not thoroughly cleansed before the introduction of the peroxide. It seems to me that the peroxide of hydrogen, or any other agent, should not be used in the canal of a tooth until fine instruments had removed all of the dead pulp-structure possible; and then it should not be used upon a roll of cotton, if introduced into the fine part of the canal. A small syringe or drop-tube which will cause the liquid to enter the pulp-chamber is sufficient, and that method takes from the operation one of the elements of danger. Capillary attraction is ever present, and fine points which do not entirely close the canal may then be used as pistons to assist in getting the fluid to the apex. It will be thought unprofitable to discuss the details of this case further on the plea that the results in one case prove nothing, but I feel like entering a vigorous protest against condemning peroxide of hydrogen, or any other agent, because pain or abscess sometimes follows its violent use in a canal which has not been thoroughly cleansed, and also against remarks of an extremely affectionate nature being made concerning iodoform or other drug because direful results do *not* follow its comparatively gentle insertion into the pulp-chamber only and without any "stirring up" of the contents of the canal. A fair comparison of the two agents could only be made after their use in conditions and by methods possessing some similarity.

Dr. Rice. When I said the root was not thoroughly cleansed, I meant that I took as much out as I could with the fine points. The cotton was not used with force so that it could act as a piston.

Dr. Atkinson. Probably the difficulty is with our nominations. It is not possible that you could get fully developed inflammation in the time it was there. It was undoubtedly irritation. As far as my experience goes, I should say that the production of the irritation is by the breaking up of the molecules of peroxide of hydrogen into water and free oxygen; and then the pressure in the channels will be such as to be intensely painful, simply from the distention of the diseased territory. Many times I have made three or four incisions to get rid of these arms of the abscesses without further treatment. It was not yet inflammation; the already established irritation present led to the tenderness. In such cases I would tie a string around the tooth and pull upon it to relieve the pain of pressure, in drilling through the foramen, in any central incisor or single straight-root tooth.

Dr. James G. Palmer. I had a somewhat similar case in which I followed Dr. Sanger's advice concerning complete cleanliness. After everything was perfectly clean and free, I used iodoform in the tooth. The death of the pulp had been occasioned by a blow a year or two before, and my experience is that there is always more trouble with these cases than with any others. I drilled into the tooth, removed the pulp from the pulp-chamber, and put in iodoform, without cleansing the root-canal; so there was no chance of forcing anything up to the foramen. The tooth was then closed with gutta-percha. In twenty-four hours there was intense pain, but no swelling. When the gutta-percha was removed there was a discharge of thin, yellow-colored serum, and the tooth continued in that condition for three months before I could conquer it. I used nothing but iodoform all the time. If anyone can throw light upon that case I should be glad. The discharge remained the same in character all the time. There was no pain or inflammation after the removal of the stopping.

Dr. Sanger. I would first thank the gentlemen for their very kind discussion of my paper. In regard to what Dr. Atkinson said about my dodging the responsibility of a definite opinion, I have tried to show that where men like Virchow and Pasteur disagree on a subject men with little experience can do no more than inquire into the merits of the difference. The object of my paper is to show that no one can claim to know the whole truth on this subject. In regard to iodoform, I mentioned that drug simply as an illustration. Its peculiar action with cadaverine is certainly suggestive, as showing that a substance not a germicide may be a very valuable antiseptic. It was not my intention to give my own belief about iodoform. It certainly is not a specific, nor is any other antiseptic. Circumstances must decide in every case what agent is to be used. Above all, we must not forget that in using any antiseptic we are aiding nature. The life-principle is a vigorous one, and needs help only. The aid we give it may come from cleanliness as well as from any drug. This is a fair inference to draw from the facts in my paper. In the cases that Dr. Howe and Dr. Palmer have mentioned, where iodoform was used, the practice may not have been proper, and probably was not. Some have not gone far enough. Others have been timid, and the canal has not been ready for the drug.

One incident in my experience will show what may be accomplished by cleanliness. A lady had a tooth which her dentist told her was abscessed. It was treated for several months with different remedies, but could not be brought into a condition to fill. The lady was compelled to go to California, and the dentist gave her a syringe with instructions to wash the cavity frequently with warm water and to seek dental advice when she reached San Francisco. She did as he directed regarding the washing, and the result was so satisfactory that she neglected his direction to see a dentist. That is, two months passed by before she sought one. The gentleman who was consulted told her that the cavity was in splendid condition for a filling, and without any treatment proceeded to fill it. I saw her a year later, when the tooth was in a perfectly satisfactory condition and had not given her the least trouble. Judged by this case, cleanliness is very important.

Dr. C. D. Cook. I have had such experience, patients going along for a time without any treatment, and after a number of days or weeks I have found the tooth quite well, without any assistance.*

S. E. Davenport, D.D.S., M.D.S.,
Editor N. Y. Odontological Society.

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* For want of space, we have been compelled to lay over the remainder of the report until our March number.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, December 10, 1889, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. A. L. Northrop, in the chair.

Dr. V. H. Jackson, chairman of the Clinic Committee, read the following

CLINIC REPORT.

A stated clinic of the society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street.

Dr. George A. Young, of Concord, N. H., demonstrated his method of rapid filling with gold. He uses Hood & Reynolds's soft No. 2½ foil, which they make to order, and sell as a No. 3 foil. For small cavities one-fourth of a sheet of gold is folded upon itself, keeping it square until of proper size for a pellet, and then rolled with the thumb and finger. It is passed quickly through the flame to make it slightly cohesive. In the preparation of the gold the pellet is left long enough, so that when it is pressed into the cavity by pressing an instrument in the center of the pellet it is doubled again on itself partially, and then adapted to the walls of the cavity with both hand-pressure and automatic mallet. Similar pellets are introduced and treated as before until the cavity is completely filled, usually taking from three to four pellets if in strong teeth. To finish, the surface is condensed with small serrated points and the mallet, and then burnished and polished in the ordinary way. For large cavities a full sheet of gold is treated in the same way, not often folding more than one sheet in one pellet, however. . . . Dr. Joseph Fournier, of New York, presented a patient about thirty years of age whose face was almost entirely covered with scars, which were the result of plastic operations performed by Dr. T. T. Sabine, of New York, between May 28, 1878, and July 20, 1884. The patient's trouble originated after a blow which he received in the face when about ten years old. The result of this injury was an extensive necrosis, destroying the bones of the nose as well as those of the hard palate of both upper jaw-bones, necessitating the removal of a great portion of the hard and soft palate. The remains of the two upper jaw-bones were brought together, and by a plastic operation successfully united almost their whole length in the median line, but leaving an entire cleft of the soft palate. The patient's nose had been successfully replaced by securing the middle finger of his left hand in the place of the missing nose, and after union with those parts had taken place, the finger was severed from the hand and trimmed to about the form of the lost nose, which was afterward covered with integument from his forehead and cheeks. Dr. Fournier first saw the patient at the infirmary of the New York College of Dentistry in the fall of 1883, when his mouth presented the following appearance : Through the loss of the intermaxillary bone of the upper jaw the four incisors and the left cuspid were lost, and as the two portions of the upper jaw were brought together, so there was a space left of only about one-quarter of an inch between the teeth ; the lower jaw was proportionately very much larger, so much so that none of the lower teeth could be made to articulate with the remaining upper ones, thus closing outside of the upper teeth. When the mouth was opened as far as the patient was able to open it, there was only a space between the upper and lower teeth measuring five-sixteenths of an inch. The new nose of the patient, for the want of bony support, had fallen in, and the skin presented many wrinkles. As the teeth that were present in the lower jaw were of no use to the patient and a source of annoyance, they were extracted, leaving only the right lower bicuspid for the purpose of securing a lower artificial denture. The impression of the upper jaw, together with the cleft in the soft palate, had to be taken in two layers, as the patient could not open his mouth wide enough to have it removed in one portion. The impression for the support of the nose was obtained by molding a piece of hard wax to the desired form, letting it extend some distance out of the nose, and while this was in position an impression was obtained with plaster of Paris of the labial portion just beneath the nose, after which the wax and the plaster were withdrawn and invested. On the labial end of the nasal supporter was placed a lateral piece upon which was fastened an artificial moustache. While the wax model of the nasal supporter was in the first part of the rubber flask, the central portion of the wax was removed in such a manner that when vulcanized it presented only a shell open on the under surface, in the cavity of which the patient places a quantity of cotton or bibulous paper to absorb the secretions of the nares. The obturator was made of hard and soft rubber. On the hard-rubber plate there was but one central incisor, which filled the space formerly occupied by five teeth. The teeth for the artificial substitute for the lower jaw could not be set back far enough to articulate with the upper ones, so Dr. Fournier used plain rubber teeth, set them with their labial side toward the tongue, and in this way a fair and useful articulation was obtained. . . . Dr. H. G. Marshall, of New York, presented an instrument for carrying cotton-dressing into nerve-canals. He takes a cambric needle, No. 10, and removes the upper part of the eye, leaving a fork, and then anneals, and uses an ordinary broach-carrier for a handle. . . . Dr. George F. Reese, of Brooklyn, showed a tube with one end closed with amalgam and oxyphosphate, and the other with oxyphosphate and gold foil, with the phosphate cut away from the inner part of the plug, exposing the gold. Oil of cloves was placed in the tube, by which he wished to demonstrate the superiority of the amalgam and oxyphosphate, the odor of oil of cloves being quite perceptible from the gold and phosphate plug, and not from the other. . . . Dr. Henry W. Gillett, of Newport, R. I., presented a little separator for use in front teeth made with a piece of piano wire, 22 gauge, one end being flattened and having a wedge-shaped nickel head (made from nickel coin) 3-32 of an inch square at its base, the rest of the wire having a screw-thread, and carrying a similar nickel wedge free to slide upon it, and a steel nut 3-32 of an inch cube, by which the wedges are drawn together to force the teeth apart. . . . Dr. J. A. Kimball, of New York, presented models, and reports progress in the treatment of a case of prominent lower jaw, and will present patient with the appliance at a future clinic. . . . . Dr. C. F. W. Holbrook, of Newark, N. J., presented a lady with two Ward's electro-metallic dental plates, completed, and in the mouth. . . . Dr. R. H. Upham, of Boston, Mass., not being able to give us his clinic in person, forwarded three models of appliances such as he constructs to supply lost parts of the nose. The form is made of English rubber (white), covered with muslin, and painted flesh color. By covering with muslin the paint wears better, and looks more natural. He usually retains the appliance by extending one or more silver wire springs into the nostrils that press at different angles, usually upward and outward, with a thin silver plate about 3-16 inch by ½ inch in size (or of size to suit the case), soldered to the end, and the springs attached to what he terms the elbow, which is also made of silver, to rest on the septum or the floor of the nose as the case requires. The metal elbow is attached with a screw to the vulcanite model through the part that separates the nares. No absorption has resulted in a case where such an appliance was worn ten years and retained in this manner.

Incidents of Office Practice.

The President. Have the gentlemen anything to present under the head of Incidents of Office Practice?

Dr. Kingsley. Yes, sir; a word of warning. There was sent to me from a foreign country a little daughter of a distinguished family whose teeth required regulating. The superior incisors were precociously developed. The child was under eight years of age, and the cuspids and the first bicuspids on each side of the upper jaw were already pointing through the gum, and these four incisors were standing all sorts of ways. This was last spring. That irregularity was corrected.

The family were anxious to go to the seaside to spend the summer. I put on a retaining-plate, which for the time being was necessary to cover the grinding-surfaces of the back teeth,—that is, one of the deciduous molars and one sixth-year molar,—and there was a band passing from the plate around the incisors in front to retain them in position. I gave instructions that it should only be worn for three or four weeks and then be taken out, and if there should be any change in the position of the teeth, to put the plate back again. The child went from under my care. She was at an age when teeth move into place very easily, and only need support for a limited time. That child came back into my hands this last week. The incisors remained just as they were when the case left my hands, and the child was wearing a retaining-plate similar in form to the one I had made. I was told that the one I had made became useless from the band breaking, or something of that kind, and another was made, and still another, each covering the molar teeth, and have been worn for six months. What is the result? The lower incisors have elongated, and the teeth back of these incisors will not meet each other by one-sixteenth of an inch; and the child is going to Great Britain within ten days. I said a word of warning. It is very rare for me to put in a retaining-plate, or to use a regulating fixture that covers the grinding-surfaces of the teeth. I have spoken and written against it, and I say again, always avoid it if it is possible to avoid it. Nevertheless, one of my own patients has gone astray because somebody had seen that I had done such a thing, and supposed they must do it.

Dr. Ottolengui. Mr. President, I have a case which I wish to describe because of the lesson which it seems to contain. I have never used arsenic in a temporary tooth but once, and that was in this case. The patient was about three years old at the time, and the tooth the lower temporary second molar. The pulp was badly exposed and aching. I tried a number of medicaments unsuccessfully, and then applied arsenic, exercising all the care in my power, covering with gutta-percha. I think it was left in about six hours, when it was removed, the tooth washed out with warm water, and a light dressing of creasote left in over night. The following day the pulp was removed entire, and the cavity filled with amalgam, the canals being left empty. When the boy reached the age of six, there was an abscess and fistula which induced me to extract the tooth. Now at the age of about eight the bicuspid is erupting prematurely (the upper centrals not having yet appeared), and the enamel is poor. In appearance it resembles brown calculus, and it has no greater density. It is easily chipped off with an excavator. The question which arises is whether the arsenic injured the enamel germ, and does this account for the miserable quality of enamel on this tooth?

Dr. Atkinson. The way to understand that is to determine whether that is a constitutional cachexia, or whether it is traumatic,—that is, from the application of the medicine. When the other tooth, the bicuspid on the left side, erupts, look and see whether that is in a healthy condition or not. If it is, then it is probably the result of the application. If it is a constitutional cachexia, it involves the deposit of the ameloblast germ which forms the enamel; then you will not attribute it to the arsenic. I might possibly be better understood by being a little more prolix. When you want to know whether a disease is constitutional or not, see whether it is bilateral, whether it is on both sides of the median line. It is possible that it may not be constitutional, yet still be bilateral; but if it is unilateral, then some external thing or instrument produced the mischief, and it is not constitutional.

The President. I have the pleasure of introducing to you Dr. L. D. Shepard, president of the Massachusetts Board of Registration in Dentistry.

Dr. Shepard read a paper entitled "The Dental Diploma, the Dental College, and Dental Legislation—an Examiner's Experience and Suggestions based thereon."*

Discussion.

The President. The very interesting paper you have just heard read is now open for discussion, and all present, whether members of the society or not, are invited to take part. Will Dr. Atkinson please open the discussion?

Dr. Atkinson. Mr. President and Gentlemen, I rejoice exceedingly to have lived to see so many dentists assembled together of such skill as I know them to possess, to hear such a paper as this, so plain, direct, and to the point, and leaving us almost without a possibility of suggesting an honest and truthful criticism against it.

I do know something about dental teaching, and something about studying the materials we work upon and the materials we work with; but I know so little of the one objectional question in the paper that I would feel like putting the lecturer upon the quiz stand, and requiring him to tell why anything is done without having an interminable list of repeated whys and interrogation-points that goes entirely beyond anything we can demonstrate. He said that when teaching they did it inspirationally or fancifully. I guess all that we know of the why comes through that door.

This paper needs to be seriously considered seriatim, and the discussion continued day in and day out until the entire field has been exhausted, as far as we are able to exhaust it, and then we can fall back upon the blessed hope which he suggested, that the teachers would not allow it to be as it had been. If anyone had prophesied that we could have had such a paper with such a presentment of clean-cut observation of the work of dental faculties, especially of the infirmaries, what would he have been thought? An hyperbolean. They would have said, as they have said to me, "Come out of the clouds; we are making progress." How? Not by that little selfishness and ambition of getting a few unclean dollars, that has been beautifully knifed in the paper, by charging for clinical work; that has been one of the crying sins of all the schools,—the taking of a fee. It is subterfuge and a misleading idea all the way through. I have tried to get an infirmary started that should be a real charity, with a clinic that would be free, after the English style. There are rich men who, if applied to by their dentists, would be glad to give the money to start such an infirmary, where all the people would have the benefit of the best skill.

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*Dr. Shepard's paper will be found at page 92 of the current issue.—Ed. Dental Cosmos.

If there is a thing that I would emphasize with an especial emphasis, it is that the teacher in operative dentistry should be the factotum in entirety of the preparation and the fulfillment of the care of the teeth.

Many times the teacher will transcend his own best efforts through the surroundings and suggestions of inquiring minds of young men, and will be prompted and enthused so that he will come up to a better standard than he could formulate so as to teach serially by a set formula. The way to teach is to demonstrate. I have repeatedly said that if there were any way of doing my highest duty to my pupils it would be to take them with me right over my patients and let them see every single step, and have them say how it impressed them, and talk the matter over, so that they should know when a cavity was prepared to be filled, and when it was worth while to begin. And when you have started a filling in a well-prepared cavity, and by some mishap one little tilt should exhibit itself, as you love success, and righteousness, and truthfulness, do not attempt to poke that back to its place by any kind of demoniac device or subterfuge of his Satanic majesty, but take it out and begin anew. Always hasten to make right a wrong the moment you know it to be a wrong, and then you will be men fit to stand before men of high or low degree, and acquit yourselves conscientiously of the work in hand. The essayist speaks deprecatingly of having boys who graduated last year for demonstrators. If there is a man fit to teach another, it is a man that has just escaped the ordeal of the teachers and has the things fresh in his mind. I would not put octogenarians over young pupils—unless the octogenarians were Atkinsons, and born fresh every day.

Dr. Carl Heitzmann. Mr. President, the question brought up before you to-night has for many years occupied thoughtful minds, and as bright ones as are here present. I wish to refer, for instance, to the discordancy that exists in two highly cultivated states in Europe, Germany and Austria. In Austria every man who has gone through a five years' course of instruction in a university, especially the medical department, and obtained a diploma, is, without any further examination, considered fit to practice. In Germany that will not do. There, before a man is accorded the right to practice, he must pass an examination before a State board. This is one of the points brought forth in the paper: shall we have a compulsory examination by a State board or not?

I was not born in America. I am sorry for it, but I could not help it. At present I am proud to be a citizen of your country. In our State, I understand, a very liberal view prevails concerning the practice of dentistry. A diploma from a college entitles a young man to practice here, as well as a certificate from the State board in Albany. I am a teacher of a department which is, perhaps, not immediately connected with dental practice, viz: histology, more especially dental histology. I established fifteen years ago a laboratory for microscopical research, and it has been successful beyond anticipation: nearly a thousand students, among them about two hundred dentists, have been instructed in my laboratory. Why have I been so successful? Because I was in earnest, and taught nothing but what I was convinced was the truth. I am an enthusiast in my line, as is Dr. Shepard in his. I would say, Don't go too far in what you ask of young men. I am rather liberal in this respect myself. The doctor says we should know the "why." Do we know the whys at all? The doctor alludes to oxyphosphate fillings that will dissolve by and by. Does such a filling dissolve in every instance? And why? He alluded to the secretions of the mucous follicles as the cause of such a dissolution. Does that settle anything? The mucous follicles—incorrectly so called—are, in fact, glands, which secrete something which is a product of living matter. Why that dissolves oxyphosphate, or in what way, nobody can tell, I am sure.

Don't you go too far, please. Be forbearing. I have had experience in public teaching,—a lecturer for eight years in the dental college of this city, and am proud of it. Year after year I make my business lively: I make the students laugh occasionally, and they like my way of instruction, eagerly following my words. But I would not like to state how many do know everything I have said to them after the hour is over, however simple the facts laid before them may have been. These matters are extremely intricate. Let me compare our colleges with those abroad. I do not think we should suffer by the comparison at all. The students in the European colleges, it is true, spend five years. But how? In the coffee-house, may be. Here they spend two or three years, but they are in bitter earnest. Suppose we admit that a six months' course is too short. I admit that many colleges are not worth the paper on which their charter is written, though I have no experience about that. My personal knowledge is limited to my own laboratory and to the New York College of Dentistry, and of them I can speak with praise. I have had gentlemen in my laboratory who prepared for a State examination, being sent to me by practitioners. I taught them nothing but anatomy and histology. Will Dr. Shepard claim that everyone of the State board is as enthusiastic as he is? Will he maintain that everyone of those gentlemen is willing to go to the bottom of each respective victim and find out how much he knows about the whys? I will tell you an example. A pretty bright man some years ago was prepared by me for an examination before the State board. He went to Albany and was examined, and when he came back he had his certificate in his pocket. I asked him, "How did you get along?" He answered, "Nothing but fun; the whole thing was fun; they asked me a few questions that were so easy that I got cheeky, and said, 'Why don't you ask more questions?' They said, 'It is all right; you seem to know all about it.'" Evidently that board of examiners has a great deal to do. If you are liberal, you will take the ground that a certain amount of positive knowledge is sufficient in starting a young man, and that if he is honest and has brains he will educate himself and find his way after all. You cannot teach him in two or three years what to do in all his future life in every single case: his own brains will tell him that; you can only give him general directions. We know too well how theories as well as methods of treatment are at variance. I am not a dentist myself, but I read in your journals about those matters, and I find filling methods that were forgotten for twenty years and are taken up again. A young man being taught but one method of filling with gold is certainly instructed insufficiently; for, according to the needs of certain cases, different filling-materials ought to be employed. Even the gold methods are greatly at variance, and still may accomplish everything desired, if applied by a skillful dentist. Be liberal, please; do not let us have too much of set methods and of absolute doctrines, which I consider superfluous or even erroneous. The college teachers are the men who ought to do the work, and if they are conscientious men they will do it. They will not allow an insufficiently educated man to go out before the public and kill teeth. The State board of examiners is well enough in Massachusetts, but in our much larger State of New York, where such a large number of dentists are going out each year, how can a State board of examiners really maintain that they are competent to examine every man and find out how much he knows? I am pleading with Dr. Shepard for more liberality in this matter.

The President. With reference to the State board of examiners, I will call upon Dr. Kingsley as one of the first members of the board in the State of New York.

Dr. Kingsley. Well, gentlemen, I had no idea that the State board of examiners had degenerated since I left it to such an extent as indicated in the story told by Prof. Heitzmann. That board remains the same as it did, with one exception, and that exception is my successor; and I have every reason to believe that my successor in the board is as thorough as I was, and that the board as a whole is as thorough as it ever was. If Dr. Heitzmann's statement is true, the influence of my successor upon the other seven members of that board must be very demoralizing. I cannot understand how any gentleman who has been before the board for examination can say the examination was mere fun. Certainly during the sixteen years that I was there I know perfectly well that every candidate that came before the board was examined with all the thoroughness and conscientiousness that any man could bring to the examination of another, irrespective of who the individual was. We knew nothing and cared nothing about him personally.

Many a time I have examined a man before me without knowing anything about him except what I learned from his answers to my questions, and I know that anyone who ever went through the examination of that board and came away and called it fun must have been able to get fun out of a funeral. It is quite possible that sometimes a person may have submitted to a very limited examination and may have thought it was fun. I will give you an illustration. It was my habit, in the course of the examination which I was called upon to conduct, to confine it almost entirely to branches which were taught in my work on oral deformities. One of the easiest ways of getting at the matter was for me to ask the candidate if he was familiar with the contents of that book. At one time a gentleman from Massachusetts appeared before us. I said, "Doctor, how long have you been in practice?" He said, "Twenty years." "Why do you come before us for examination?" "Because I want to begin practice in this State, and I cannot unless I am indorsed by this board, being without a college diploma." "Have you ever seen this work?" and I pushed my book out toward him. He took it up and said, "No." "Are you familiar with its contents?" He said, "I presume I am." "What makes you presume so?" "Because I suppose it is much like all the other books; they are all alike; you cannot find anything more in one than in another; I suppose this is a compilation from other works." I said, "By the way, do you know the author?" He looked at the title-page and said, "I do not." "Did you ever see him?" He said, "I do not think I have." "Did you ever hear of him?" He said, "No." I mentally said, What is fame! I said to him, "The reason I asked you about that book was because I thought if you were familiar with it we could get through a little easier. The first subject treated in that book is the cause of irregularities of the teeth. Tell me now, in your own language, what you regard as the cause of irregularities of the teeth." He braced himself up immediately, and said, "Well, in my opinion, from my observation, the cause of the irregularities of the teeth is bad ventilation." I asked him three or four more questions, and passed the subject of irregularities of the teeth. I asked him a few questions on other subjects and found the answers about as intelligent, and said, "That is all." He said, "Are you satisfied?" I said, "Yes; quite." Let me assure you that if any man ever went before that board during the period of sixteen years that I was connected with it and obtained its certificate, that man had a pretty hard siege of it. Our object was not to torment the man, but to give him a thorough examination before we put our names to a certificate stating that we believed he was qualified to practice dentistry. That was our object, and we performed our duty.

In regard to a question that was brought up in the paper of this evening, the length of time required by the colleges for the attendance of students, I do not know that there is any better way of arriving at the result, taking students as they come to the colleges, than to decide the matter upon the basis of time; but personally I always rebel against it. I do not believe that it is the best way in the end, whenever that end shall arrive; I do not know when that will be; it may not be until we are "looking backward" to the Boston of one hundred and thirteen years before. It seems to me that the only true way is to ascertain in some way or other the real qualifications of the man, and when you find he is qualified then give him his diploma. It ought not to make any difference whether he has studied six months or six years. I was once connected with a dental college, and also since that time I have seen many students, and I know there are students who will know more after six months' application than others will know after six years. I do not see why a man who is able to answer all the questions after six months' study and show superiority in handicraft should not be entitled to his diploma then, and not be compelled to hang on for the rest of the term of three years before he can get his certificate. A Baltimore college, I believe, attempted to carry out that idea, but they were sat upon by the rest of the colleges and apparently by the dental profession. But the day is coming, I believe, when diplomas will be granted upon merit, and students will not be permitted to lounge around a dental college for two or three years and fill it so full of tobacco-smoke that no decent person could tolerate it.

Dr. B. Hess. Mr. President and Gentlemen: The board of examiners may be well enough, as we have it in this State, to examine those who are not graduates. From my experience as a student and as a graduate of the New York College of Dentistry, I am convinced that most of those who pass its examinations are capable of standing any State board examination, no matter how strict it may be. But I hardly think it necessary to subject them to a second trial, as they would be compelled to undergo should they move to Massachusetts.

The President. Gentlemen, Dr. Shepard is not here alone from the Massachusetts board of registration: he comes well supported and protected. Dr. McLeod, of New Bedford, the secretary of the board, will make a few remarks on this subject.

Dr. E. V. McLeod. Mr. President and Gentlemen: It would be impossible for me to add anything to that which has already been said in support of the paper read before you by the chairman of the Massachusetts board of registration, except that I am in sympathy with him in the matter, having formed my opinion from graduates who have come before us for examination, and having also been an instructor in a college in Boston. Although I favor the colleges, still I admit they are at times so overcrowded with students that the teachings in the lecture-rooms cannot be carried out in the infirmaries, through lack of a sufficient number of instructors. I believe that we lack the discipline, force, and strength which we ought to have in order to instruct young men to practice dentistry as it should be practiced.

Dr. G. E. Mitchell, Haverhill, Mass. Mr. President, there is nothing I can add to what has already been said by the other members of our board. I can only fully indorse the sentiments and facts of Dr. Shepard's paper. And since he is asked to be "more liberal," I must say that it would not be best. During our three years' service as examiners, had Dr. Shepard and the other members of the board not been exceedingly liberal and considerate as possible, more college graduates even might not have passed the examinations of the board. We of course have not expected of candidates a display of that knowledge and experience which comes after years of practice only, yet have asked of them to perform a fairly good operation and show to us they had a general knowledge of dental subjects and theory sufficient to prove that they were at least on the right road and likely to take an honorable position in the ranks of the dental profession. I think dentists generally should give their students more attention and better opportunities; they, the students, do not in a great many instances have a chance for anything in the way of operative dentistry and study, but are kept at work all the time in the laboratory.

Let this be done, and colleges profit by a study of some of the facts as given in the paper this evening, and then dental boards will be given more strength and students better prepared for their examinations, as well as their own future success.

As I have nothing new or interesting to offer you, I can only thank you, Mr. President, and the other members of this society, for your kindness in making our little visit so pleasant and interesting.

Dr. Shepard. Mr. President, I will not occupy your time any further ; I merely want the gentlemen to carry away with them the one thought that in my paper I was as far as possible impersonal, having no reference to any particular college. What I said is general, and I think the points are well taken. The fact is that the different States have dental laws, and men have to obey them. The State of Minnesota had a law for many years which was rather generous ; but the State of Minnesota has to-day a law that is as far ahead of any other State law as our law is ahead of the laws of some other States. It requires a yearly examination, and a man has to take out a yearly license ; so if he falls from grace he can be prevented from practicing. That is an advance which is worthy of following.

One other fact : When, a year ago last summer, a certain college was left out of the list of reputable colleges by the National Association of Dental Examiners, that college raised heaven and earth to be put back on the list of dental colleges. The edict of the National Association of Dental Examiners, that a college was reputable or disreputable, meant its life or its death. There is a power of law and the agents of the law back of this question, and it is a great power ; and it is the hope of the future of dental education, rather than the dental faculties or the profession at large. The case I speak of is an illustration of the power of law, and it is well to take that into account. The time will possibly come, and in some respects it is desirable, when a college may examine students and grant diplomas irrespective of the time of study ; but when that time comes college faculties must occupy a higher plane than they do at present, and there must be no pecuniary considerations affecting their decision. I think the other position is the right one, that the college is simply an educating body and nothing more. It is a combination of teachers to instruct men. The license to turn them loose on the community, to benefit or injure them, is a question for the state, and it is going to be so more and more in the future. It is quite interesting to read in the papers, within a day or two, of the arrest of three people over in Brooklyn who refused to treat a case of diphtheria because they believed in the faith cure. The state interfered. Why? For the protection of the community. Individual belief or disbelief in Christian Science was not the question ; the community was in danger, because diphtheria was there and might spread its virus among innocent people; therefore the state interfered, and rightfully.

Dr. Littig. Is it a fact that a man with a medical diploma can practice dentistry in the State of Massachusetts without passing your board?

Dr. Shepard. It is not. Our law reads a little differently from other State laws. In most States it reads, "Nothing in this act shall prevent or prohibit physicians from extracting teeth." Our law reads, "Nothing in this act shall apply to any practicing physician who is a graduate from the medical department of any incorporated college." The question hinges simply on the definition of the words, "practicing physician," in distinction from practicing dentists. That question came up, and some half a dozen men who were M.D.'s and members of the Massachusetts Medical Society refused at first to register under the law; but after an amicable and courteous correspondence all registered as dentists. This exemption in our law is held to be equivalent to the phrase used in other laws in regard to extracting teeth.

I have here a tooth with a cavity which has been prepared in one of our demonstrations for the introduction of a gold filling, by a gentleman who is a graduate from a prominent college, one of the best colleges in the land. The undercuts are something fearful.

The thanks of the society were extended to Dr. Shepard and to the visitors who participated in the discussion.

Adjourned. B. C. Nash, D.D.S.,
Secretary.

INTERNATIONAL DENTAL CONGRESS.

(Continued from page 63.)

M. Guerini, from Naples, Italy, made a short communication on "Obturation, or Filling of Teeth by means of Fragments of White Coral." He claims that such operations are easily made, that this material is of about the same density as dentine, that heat and cold are not readily transmitted by it; that it resists the action of mastication, as well as of the saliva, does not become discolored, and can be very easily removed in case of trouble. Moreover, it has a much superior power of resistance to the fluids of the buccal cavity than cements have. As regards the *modus operandi*, it is similar to inlaying of enamel.

Arnim Rothmann, M.D., from Buda-Pesth, made an interesting communication on "The Pathological Histology of the Pulp," the lesions of which he demonstrated by a series of excellent microscopical preparations. The author divides the lesions of the pulp into—1, partial acute pulpitis; 2, partial acute suppurative pulpitis or acute ulcerous pulpitis; 3, total acute pulpitis; 4, total suppurative acute pulpitis. Partial acute pulpitis the author describes as limited in extent, with possible hemorrhage ; he also says that the seat of the local pulp-lesion is not always in relation with the lesion of the dentine ; for example, in a case of caries of the masticating surface the seat of the pulpitis was near the neck of the tooth ; in other cases there are two seats of inflammation. Partial acute suppurative pulpitis is characterized by an ulceration at the surface of the pulp, with presence of pus. Total acute pulpitis distinguishes itself from the first by this fact, that the entire pulp-organ is involved ; the pathological manifestations vary according to the duration of the primary cause. This section is subdivided into—A, traumatic acute pulpitis, which presents several varieties, in accordance with the time which separates the traumatism and the microscopical examination of the pulp ; B, parenchymatous chronic pulpitis, characterized by chronic hyperesthesia or hyperplasia of the tissues. In total suppurative acute pulpitis, pus forms in the center of the organ and extends to the periphery.

The author thinks it important that we should distinguish the four forms of pulpitis.

In the first case we have an inflammation which commences under the odontoblastic layer and extends to a very short distance around. This inflammation is characterized by a cellular infiltration, which is probably caused by micro-organisms. The second form is also a suppurative process, which destroys the odontoblastic layers, and which, according to the intensity or duration of the disease, extends itself more or less deeply into the layers of the pulp ; if the disease lasts a long time it becomes similar to the ulcerative form of the total acute pulpitis. Finally, the chronic total suppurative pulpitis is a chronic pathological process beginning in the center of the pulp and extending slowly to the periphery.

Prof. Poinsot, from Paris, read a communication on the " Accidents produced by Dead Teeth kept in the Mouth."

The author says that the presence of dead teeth in the mouth must always be considered seriously, and a reserved prognosis must be given. General diatheses are determining causes of certain pathological lesions observed in the dental organs, and he insists on the fact that even without caries we often observe pulp-mortification.

It is important to determine the cause of the mortification, which can be produced from different sources, such as traumatisms due to false articulation, faulty dental evolution, defective prosthetic apparatus, rapid regulating, or rapid separation of teeth. Real traumatic causes do not bring on very grave lesions, but the others, in which bacteria or their excreted poisonous alkaloids are present, might bring about very severe pathological lesions.

M. Bleichsteiner, from Austria, read a communication on " Injections of Cocaine as a means of producing Local Anesthesia."

The author recommends for antiseptic purposes that the solution of muriate of cocaine be made with $\frac{1}{5000}$ solution of mercuric chloride. The action of the injections is not so favorable when the injection is made in a hyperemic or tumefied gum. The anesthesia usually lasts about ten minutes. A five per cent. solution of cocaine is quite sufficient. As a general rule, not more than five centigrammes, or one grain, ought to be injected at one time. If a half-hour is allowed to elapse between the injections, the dose can be carried to fifteen centigrammes, or three grains. One should make several punctures, and inject the slightest quantity of cocaine in each puncture. Extraction should follow the injections as soon as possible. If one has several operations to perform, he should not inject the needle in the neighborhood of the wounds produced by the previous extractions, so as to prevent a too rapid absorption of the drug. In case a collapse should occur, the patient should be immediately placed in the horizontal position, alcohol or wine given internally, and nitrite of amyl by inhalation. In cases of hysterical attacks, it is well to give an injection of ten drops of ten per cent. watery solution of aqueous extract of opium.

Prof. Poinsot, Paris, made a communication "On the Injection into the Gum of Pure Cocaine."

The formula recommended by the author is :

Oleo-naphthine (liquid vaseline),
Arachis oil, *āā*, 50 centigrammes ;
Pure cocaine, 5 centigrammes.

By the use of liquid vaseline the author finds that he is able to localize the action of cocaine at the point of injection, or at the utmost in the parts immediately surrounding it, and to prevent in this manner its action on the general system, except in very rare cases. It also prevents a sphacelus or necrosis of the alveolar borders. It is important to inject with the greatest care. With the formula recommended above it is necessary to dissolve the cocaine by placing it in a little hot-water bath. The needle of the syringe should be as short as possible and of the smallest diameter, and it and the part of the gum where the injection is to be made should be washed with absolute alcohol. The injections must be made very slowly, and a number of them are to be made around teeth which have multiple roots. We may know when the gums are sufficiently injected by their bleached appearance. To obtain complete anesthesia, we must wait from four to eight minutes after the injection has been made. We can find out whether or not the anesthesia is complete by cutting the gum around the tooth with a lancet, or by touching the same with a red-hot iron. Cocaine ought not to be used in cases of hemophylia. It is also well only to operate on one tooth at a time, and not to extract several at the same sitting.

If unpleasant symptoms occur, ammonia is to be given to the patient for inhalation. Later we may give six or eight drops of laudanum in a cup of strong black coffee without sugar. Local anesthesia is more complete when the injection has been made in thick tissues in a physiological state. It is much less complete when the mucous membrane is thin and in a chronic pathological condition.

The teeth of the superior maxillæ are extracted with much greater success in regard to sensibility than those of the inferior, especially the lower molar and wisdom teeth. This is the result of an experience of nearly two thousand cases on whom this method has been used.

Richard Chauvin, D.E.D.P., from Paris, read an essay on cocaine.

The author thinks that notwithstanding the researches of Lubermann and Giessel, who both experimented with cocaine obtained by synthesis, or with cocaine purified by other processes, one must always use this drug with great caution. The accidents which are observed by the use of these chemically pure preparations are of an exclusively nervous kind. As by the purification of cocaine the toxic alkaloids, ecgonine, isatropilcocaine, which are cardiac poisons, are eliminated, there is no reason to be surprised by the disappearance of the cardiac toxic symptoms.

The author also thinks that it is indifferent whether cocaine be administered under the form of a salt, such as the muriate of cocaine, which is soluble in water, or the alkaloid cocaine itself, which is soluble only in a two per cent. quantity, in oleo-naphthine or liquid vaseline, provided the product is a chemically pure one.

The best means of preventing accidents from the employment of cocaine is to introduce the hypodermic solution very slowly, and to give only moderate doses of the drug, not more than one-half grain; and if trouble is anticipated from a nervous state of the patient, it is better to take about five minutes to introduce the whole quantity of the solution,—that is, about one-tenth of a grain every minute. By operating in this manner we have the opportunity to stop the injection as soon as the first toxic symptoms appear, while the local anesthesia is at the same time more complete. With pure products, if the nervous symptoms are thus not completely prevented, they are very much diminished.

Arthur C. Hugenschmidt, M.D., D.D.S., from Paris, next made a communication on "The Accidents of Cocaine, how to Prevent Them as much as possible, and the Clinical Action of the Drug."

The accidents of cocaine are divided into two classes: 1, local accidents; 2, general accidents.

Local accidents (molecular necrosis of the tissues, or necrosis of the alveolus) can be prevented by washing with an antiseptic solution (bichloride $\frac{1}{1000}$) the parts to be operated upon a few minutes before the injection. The solution must not be over two or three days old, and in preparing it even the distilled water ought to be boiled for at least five minutes before being used.

General accidents observed are of cardiac, respiratory, nervous, and calorific origin.

Cardiac and pulmonary symptoms present themselves at the same time. They are an acceleration and irregularity of the cardiac rhythm, palpitations, and irregularity and interference in the respiratory movements ; respiration becomes difficult, catching, and even stops momentarily.

Cardiac symptoms are due to an influence of the drug on the pneumogastric nerve, which is the cardiac inhibitor.

Respiratory symptoms are due to an action on the pneumomedullar center, and also to an interference with the sensibility of the pulmonary surface, preventing the pulmonary reflex. We observe, when the patient is in a state of semi-lethargy, that he stops breathing for a few seconds, but immediately takes a long breath if he is told to do so ; hence volition or will is not interfered with ; only the pulmonary surface sensibility is partially obtunded.

The calorific symptom consists in a lowering of the peripheral temperature, and is due to a stimulating action on the vaso-constrictor filaments of the great sympathetic nerve, which, by producing a contraction of the arterioles, diminishes the quantity of blood supplied to the cutaneous surface.

The brain symptoms which present are : a strange feeling in the head, a sensation of emptiness ; the patient complains of vertigo, blurring of vision, everything dances before his eyes ; he looks frightened, his face is pale, perspiration appears on the forehead, he feels that he is going to faint, and then passes into that semi-lethargic state observed in opium-poisoning ; this indicates an action of the drug on the cerebrum, the production of cerebral anemia. This is sustained by the fact that plethoric persons are much less apt to present nervous symptoms after the administration of the drug. Again, if we produce a physiological cerebral congestion before injecting our drug, the toxic symptoms will not appear. Moreover, if to a person who presents all the symptoms of cerebral congestion we inject cocaine, these symptoms will disappear.

To prevent the accidents just described as much as possible, the rule has been in the author's practice :

1. To postpone operating for any person presenting in a frightened condition, the psycho-physiological action of fear being to produce cerebral anemia. Moreover, cerebral anemia being the most common accident observed, to prevent its occurrence several methods have been recommended.

Prof. Lépine, of the medical faculty of Lyons, recommended the inhalation of nitrite of amyl immediately before injecting the drug.

M. Poinsot, from Paris, advised instead of water, for making the solution, the use of liquid vaseline, which prevents the too rapid absorption of the drug.

In the author's practice patients who appear weak or nervous are given internally, *half an hour before* making the injection, from one to one and one-half ounces of brandy in an equal quantity of water. Alcohol is a general stimulant : it will increase the cerebral circulation, as well as the peripheral one ; it will stimulate and increase the heart's action, and so places the patient in the best position for receiving a drug which will produce cerebral anemia, cardiac weakness, etc.

The operator must not operate until the anesthesia is as complete as possible ; this to prevent a reflex through the fifth nerve which might bring on cardiac syncope and kill the patient.

As to the treatment of the accidents, the patient must be placed on his back, and given internally cardiac stimulants,—alcohol, ether, ammonia, etc. ; if necessary, hypodermic injections of ether or tincture of digitalis. Tubulations of nitrite of amyl are also to be recommended.

Dr. Lecaudey, from Paris, made a short communication on the "Choice of Antiseptics in Dental Surgery."

He says that in choosing an antiseptic not only must we take into consideration the local state, but also the constitution and general state of the patient. Chloride of zinc and carbolic acid are useful especially in robust individuals without any organic lesion or suffering from a diathesis. Iodoform and iodol are to be preferred in scrofulous and tuberculous patients. In syphilitic patients the best antiseptic which we can use is a bichloride solution $\frac{1}{1000}$.

Dr. Dunogier, M.D., from Bergerac, France, made a short communication on the "Internal Treatment of Odontalgia."

He says that certain drugs have a powerful action on the fifth nerve ; to such an extent that in certain cases their action is very precise, giving relief in a few hours to pain which might have lasted several days, and necessitated finally the extraction of the painful tooth or the destruction of its pulp. In his practice, whenever the local treatment appears insufficient after repeated trials, he gives the following preparation :

Aconitine, crystallized, ¼ milligramme ;
Gelsemine, 1 milligramme ;
Valerianate of quinine, 5 centigrammes.
For one pill.

Give from one to three pills to an adult in the twenty-four hours.

Prof. Poinsot, from Paris, made a communication on "Teeth from the Frank Population of the Fourth Century of our Era."

These teeth were obtained from a Frank cemetery which is situated at Hermès, France; they are thirty-one in all. One, a first superior molar, presents four roots; three show deep grooves on the palatine and antero-external roots.

The inferior molars presented certain lesions, such as erosion, caries, resorption, exostosis, and well-marked grooves on their roots.

Two of the superior cuspids have absolutely bifid roots, while five inferior cuspids present deep grooves,—imperfect bifidity.

The only superior bicuspid which has been found presents three well-developed roots, disposed like those of large molars.

Dr. Dunogier, M.D., from Bergerac, read a paper "On Local Anesthesia by the Aid of Cocaine."

The author recommends that, before operating, an examination of the heart should be made, and also an inquiry made of patients whether they are liable to faint.

In administering cocaine he first gives one centigramme and then observes the countenance of the patient, making him speak. After waiting for five minutes, he presses on the tooth to be extracted with the pulp of the finger; if the tooth is still painful, he makes another injection, and so until there is no pain on pressure. If there is a great deal of inflammation around the tooth, the anesthetic action of cocaine will be much less noticeable.

An important point is to be sure of the good quality of the cocaine and always to use a fresh solution. For testing its quality, place a piece of cotton dipped in the solution on the gum; if after a few minutes the patient complains of a strange sensation on the tongue, it is proof of the active properties of the drug.

Dr. Dunogier also made a communication on "Chloride of Methyl," which he considers of great value in dental surgery when cocaine is inadmissible. The mode of action of chloride of methyl is similar to that of ether, only it is much more rapid, more easy to use, and its action easier limited. Chloride of methyl does not produce complete insensibility, especially in cases of sub-acute periostitis, but still it will reduce the pain greatly. It must not be forgotten, however, that it evaporates very rapidly and is exceedingly inflammable; hence care must be taken that no light is burning near it.

M. Bruegger, from Kreutzlingen, Switzerland, made a communication on the "Modifications of Obturators in view of obtaining Normal Phonation."

The author refers to the bad results, in regard to phonation, obtained by the operation of uranoplasty or staphylorraphy. The operation will in some cases result in an apparently normal soft palate, but in regard to both phonation and deglutition it will often prove defective in relation to the buccal and nasal cavities.

A mechanical appliance can only restore the parts as nearly to their normal situation as possible. A perfect obturator must enable the patient to speak normally ; no nasal sound must be heard ; he must be able to distinctly pronounce consonants and vowels, isolated or combined, and he must not be conscious of the presence of his prosthetic appliance.

The author thinks that the obturators known under the name of Schilsky, which are made of very elastic rubber, the obturator being hollow, are not sufficient for intercepting the passage between the mouth and nose, and nasal sounds are produced ; this is due to the too yielding state of the rubber, which easily loses its shape.

M. Bruegger says that the obturator and muscles must form together a mass as homogeneous as possible and constitute a partition with perfect adaptation. The author obtains as accurate an impression of the parts as possible, both in their contraction and in repose. For his obturators he uses cork combined with a very slightly compressible rubber, which gives to his obturator a very light weight, at the same time a sufficient resisting power to the action of compression of the surrounding muscles. This obturator he has used on twenty subjects varying from nine to forty years of age, with good results in every case ; certain of the patients are even very good singers.

Dr. Franck, from Vienna, Austria, gave a description of a new plate for the spreading of the arch.

The author made a short review of the development of a normal dentition. The ordinary irregularities which we are called to treat are in the majority of cases due to a retraction or a shortening of the alveolar arch, which last is either innate or acquired. The acquired form is in many cases due to neglect of the first dentition. The displacement produced in the teeth is the result of the early loss of the milk-teeth, causing retraction of the arch. Abnormal position of the permanent teeth is due also to the premature or tardy extraction of the front teeth, the resistance of the formed cicatrix over the growing tooth, a displacement of a coming tooth by the extraction of the milk-tooth, fracture of the alveolus, thumb-sucking, etc.

As to the time of regulating, the author thinks best to wait until all the front teeth and bicuspids are erupted. Spreading of the arch is in many cases a necessary procedure.

The plate presented by Dr. Franck consists of two vulcanite plates, placed one on the top of the other, and which can be separated. The plate which comes in contact with the palate is split in the middle in an antero-posterior direction. Opposite the bicuspids the plate has holes into which fit little metal pivots attached to the second plate. The second plate, which, when made, is exactly adapted to the first one, is not split in the middle, and when the little pivots are introduced into these holes in the first plate, the two plates together form a very solid and firm plate which holds very well in the mouth. If on these pivots little rubber rings are placed and then the palate plate is replaced over it and introduced into the mouth, the second plate being split, the rubber rings will produce a continuous pressure on the arch, which will gradually spread.

The author claims that his apparatus is simple and easily constructed. The patient becomes readily accustomed to it, as it remains firm in the mouth and does not interfere with speech or mastication. No irritation is produced by the slight pressure which is kept up, and the arch spreads very rapidly. It can be applied with equal facility to either the superior or inferior maxillary, and the work can be done with only one construction of plate.

M. Godon, D.E.D.P., read a paper on "Dental Orthopedia," in which he concludes that regulating teeth can be undertaken on adults, but that the length of treatment is in direct ratio to the age of the patient, and the retaining-plate must be kept in proportionately long; that in cases of projection of the superior maxillary it is always necessary to elongate the last molar, so as to elevate the articulation.

(To be continued.)

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

DR. JOHN RAMSDEN made a further report on the case of Mrs. S. C., of Cedar Grove, which he reported in the DENTAL COSMOS for May, 1889, at page 392. The patient seemed to recover completely until last June, when she had a recurrence of the pain; this time, however, not in the supra-maxillary, but in the inferior maxillary.

The patient submitted to another operation of removing the inferior dental nerve, which was done October 23 last. He was called upon by her physician, Dr. R. B. Burns, to assist with the operation, which was done very successfully.

The dental engine was used by him as in the first operation; the second operation consisted in the division of the integuments to the bone, trephining the inferior maxillary from the mental foramen to the inferior dental foramen, exposing the nerve where it was removed. Her physician reported to him that she has been free from pain since the operation.

Dr. Ramsden also reported the following case: Miss S., a young lady, called on him. The right superior lateral incisor was very firm, but considerably elongated, so much so that when the mouth was closed it showed by resting on the lower lip, making an ugly deformity. The lady enjoyed excellent health, and had never stood in need of a dentist's services. He thought of remedying the deformity by replanting the tooth by deepening the socket. He did this, but although he ligated the tooth to the adjoining teeth and kept it in place for five weeks, it refused to take root or become firm. He had to extract it, and replace it with an artificial tooth on a small plate.

Dr. Chupein asked if the peridental membrane of the elongated tooth was intact.

Dr. Ramsden said it appeared to be.

Dr. Chupein asked if, when he found this tooth would not adhere, he had tried another tooth in the socket.

Dr. Ramsden said the patient objected to this.

Dr. Chupein asked if he did not think he would have obtained better success by the employment of a piece of rubber-dam, as suggested by Dr. Herbst, for the retaining of regulated teeth in place?

Dr. Ramsden had not thought of this.

Dr. Bonsall said that he would not have approved of such an arrangement, because the strain of the dam on the teeth to which it was ligated would surely produce their elongation. He instanced cases where he had produced uniformity of length in regulating teeth by simply putting on a small rubber ring on the tooth he wished to lengthen, letting it stay in place a few days.

Dr. Chupein said he was aware that elongation might be produced in this way with rubber rings, because of the tendency of rubber to seek its minimum strain or elasticity, and in this way work its way to the end of the root, as cases have been reported; but he did not think the same effect would be produced by ligatures used as suggested.

Dr. Ramsden stated that with the ligatures he had used there *was* a slight elongation of the central incisor to which the replanted tooth had been tied.

Dr. Roberts said the case could not be termed one of implantation, because in that operation a new socket was made for the tooth to be implanted, and the tooth so introduced was held in place, not by a partial union of the peridental membrane of the root and the periosteum of the socket, for really there was no periosteum in the new socket; that those interested in or practicing implantation rather held that the tooth was retained in position more by anchylosis than by gomphosis.

Dr. Trueman asked Dr. Ramsden if in the case he first reported in the removal of the supra-maxillary nerve there was any facial paralysis.

Dr. Ramsden said there was none.

Subject passed.

THEODORE F. CHUPEIN, *Reporter.*

WASHINGTON CITY DENTAL SOCIETY.

THE Washington City Dental Society held its annual meeting December 17, 1889, and elected the following officers for the ensuing year: Dr. H. B. Noble, president; Dr. E. R. Rust, vice-president; Dr. O. D. Darrell, secretary; Dr. R. B. Donaldson, treasurer; Dr. R. H. Gunnell, librarian; Dr. J. H. Lewis, essayist. The society meets every third Tuesday in each month.

O. D. DARRELL, D.D.S., *Secretary.*

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE twenty-second annual meeting of the American Academy of Dental Science was held at Young's Hotel, in Boston, on Wednesday, November 13, 1889. There was a very good attendance of members present. President Dr. Cecil P. Wilson, Boston, presided.

The following were elected officers for the ensuing year: Dr. F. N. Seabury, Providence, R. I., president; Dr. C. A. Brackett, Newport, R. I., vice-president; Dr. E. N. Harris, Boston, Mass., corresponding secretary; Dr. V. C. Pond, Boston, Mass., recording secretary; Dr. E. C. Briggs, Boston, Mass., treasurer; Dr. Charles Wilson, Boston, Mass., librarian. Executive Committee, Dr. E. H. Smith, Boston; Dr. Thomas Fillebrown, Portland, and Dr. F. E. Banfield, Boston. Dr. W. H. Potter, of Boston, was appointed editor of the academy for the ensuing year. Dr. Harris, corresponding secretary from 1867 to 1877, by urgent solicitation of the members consented to accept that position again. Resolutions of respect to the memory of Dr. F. Searle, of Springfield, Dr. S. P. Stearns, of Boston, and Dr. J. W. Smith, of Newport, members of the academy who departed this life during the past year, were adopted by a rising vote. The annual address was delivered by Dr. J. T. Codman, of Boston; subject, "Retrospect and Prospect."

The anniversary banquet was an elegant affair. Dr. Seabury presided. The venerable Dr. Elisha G. Tucker, now in his eighty-second year, responded to a call expressing his gratification at having had the pleasure of attending every annual meeting since the academy was organized in 1867. Pertinent remarks were made by many of the members, and the occasion passed off very happily.

Monthly meetings of the academy are held at the rooms of the Boston Medical Library Association, 19 Boylston Place, which are well attended.

EDWARD N. HARRIS, D.D.S.,
Corresponding Secretary.

DENTAL ASSOCIATION OF VICTORIA.

A MEETING of the Dental Association of Victoria was held Wednesday evening, October 16, 1889, at the Athenæum, Melbourne, Dr. Springthorpe presiding. The following were elected officers: Dr. Springthorpe, president; Mr. John Iliffe, vice-president; Mr. George Thomson, L.D.S., honorary secretary; Mr. Reeve, honorary treasurer; Mr. Ernest Joske, LL.B., secretary to the association. Mr. Potts read a letter from Mr. Armstrong, secretary of the Dental Association of New Zealand, the first association which has been formed south of the line. He presented its rules and by-laws. A committee was appointed to draw up articles of association.

At a special meeting held October 31, the articles of association were submitted and approved of, and the secretary was instructed to take the necessary steps for the incorporation of the association.

MASSACHUSETTS DENTAL SOCIETY.

AT the twenty-fifth annual meeting of the Massachusetts Dental Society, held December 12, 13, 1889, in Boston, the following officers were elected for the year 1890: Robert R. Andrews, D.D.S., Cambridge, Mass., president; Geo. F. Eames, M.D., D.D.S., Boston, Mass., first vice-president; J. W. Ball, D.D.S., Boston, Mass., second vice-president; Edgar O. Kinsman, D.D.S., Cambridge, Mass., secretary; Edward Page, M.D., D.M.D., Charlestown, Mass., treasurer; Jos. King Knight, D.D.S., Boston, Mass., librarian. Executive Committee, Drs. D. N. Clapp, Boston; G. A. Gerry, Lowell; G. W. Branigan, Boston; W. E. Boardman, Boston; H. S. Draper, Boston.

EDGAR O. KINSMAN, D.D.S., *Secretary*,
15 Brattle Square, Cambridge, Mass.

MASS MEETING OF DENTISTS IN NEW YORK.

IN a mass meeting of over one hundred dentists, gathered from various sections of the United States, held in the city of New York, January 16, 1890, of which Dr. O. E. Hill was chairman, it was, on motion, unanimously

Resolved, That we thoroughly indorse the Dental Protective Association of the United States, and urge upon every member of the dental profession to join the Association, and send to Dr. J. N. Crouse, of Chicago, its president, the initiation fee of ten dollars.

WM. JARVIE, *Secretary*.

LOUISIANA STATE DENTAL SOCIETY.

THE fifth annual meeting of the Louisiana State Dental Society will be held in New Orleans, on the 19th, 20th, and 21st of February, 1890.

The programme will consist of reports from committees, essays, clinics, and display of dental specialties. Members of the dental profession are cordially invited.

J. G. McCULLOCH, *Recording Secretary*,
New Orleans, La.

NEW YORK ODONTOLOGICAL SOCIETY.

THE annual meeting of the New York Odontological Society was held Tuesday evening, December 17, 1889, when the following officers were elected for the year 1890: J. Morgan Howe, president; C. A. Woodward, vice-president; S. F. Howland, recording secretary; Charles Miller, treasurer; C. F. Ives, corresponding secretary; W. A. Bronson, curator; S. E. Davenport, editor. Executive Committee, Benjamin Lord, chairman; E. A. Bogue, S. G. Perry, Z. T. Sailer, C. E. H. Phillips.

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EDITORIAL.

THE PROFESSIONAL SPIRIT.

CONSIDERABLE attention has recently been given to a consideration of what constitutes and illustrates a "truly professional spirit." The discussion has taken a wide range, incidentally revealing curious phases of thought. According to the ideas of some, membership in a profession may be expected to work a radical transformation in individual character, to impart a regenerating power, to elevate to a higher moral plane. The professional spirit and the trade spirit have been held up in contrast as though essentially different: the one being designated "a heavenly spirit," the other an "evil nature"; the one developing "such a consideration for the interests of others as to lead one to prefer the good of another to his own benefit," the other inspiring an effort to "secure the good of the individual to the disadvantage or the injury of others."

It is of course every way desirable and commendable to establish and maintain codes of ethics—laws of association—in the various pursuits of life, by which, through a common understanding and agreement, frictions and misunderstandings may be avoided and mutual helpfulness secured. It is not worth while, however, to invite criticism by claims which are manifestly untenable.

A high standard of qualification and of character is desirable in any professional pursuit. The vocation of the clergyman, the physician, the attorney, the teacher, each suggests special fitness for the special calling ; presupposes a greater breadth of culture than that of the average tradesman or manufacturer, and certainly carries an implication of moral worth. Every professional man, as Bacon quaintly expressed it, "is a debtor to his profession from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves, by way of amends, to be a help and ornament thereunto."

If every diploma were a guarantee that its holder were truly learned in his profession, it would be no mean claim to the respect and confidence of the community. If, in addition, it were an assurance of high moral character, of pure motives and worthy ambitions, it would constitute a veritable patent of nobility.

Unfortunately, facts do not justify such estimate. While in every profession there are splendid examples of admirable fitness in all respects for the chosen calling, there are in each and all those whose unfitness is apparent from every stand-point. To improve and elevate one's profession ; having attained for one's self the requisite qualification, to inspire like effort for like result in others, is a worthy professional ambition, and it is in such efforts that a "truly professional spirit" is manifested. But it is useless to claim broadly a higher moral tone or more unselfish motives among professional men than exist in other callings or pursuits. To do so is simply to invite ridicule. It is folly to expect serious consideration of the claim that so far as the relation of the professional man to his patient or client is concerned, there is an absence of the desire and expectation of profit from the relation on the part of the professional man which broadly distinguishes and differentiates his motives from those of the tradesman or artisan. The contrasting of the professional spirit with the trade spirit, and the attempt to make it appear that there exists a greater freedom from the love of gain in the former than in the latter, will not be accepted at this day. The average man engages in farming, in manufacture, in banking, in trade, in the practice of law, medicine, or dentistry, in the hope and expectation of thus providing for himself and those dependent upon him, if not of also acquiring a competence. It is right that it should be so ; the laborer, in whatever field, is worthy of his hire. To remove the hope of pecuniary success in any department of human effort would be fatal. The reward of labor is the prime incentive to work ; and in every vocation, including the professions, suitable compensation for work done is rightly and reasonably expected.

In a recent number of *The Independent*, Rev. Howard Crosby, D.D., makes the specific claim that the ministerial profession alone forms an exception to this rule. We quote the opening paragraph of his article, as it tersely presents the general estimate of the other professions, whether it does of his own or not :

> "It is customary to speak of the three *professions* of law, medicine, and theology, and hence to reckon the practitioners in the three as having similar aims, motives, and methods. The grouping of the three is in this respect unfortunate. The lawyer and the physician practice their professions for the sake of worldly emolument, a perfectly legitimate and honorable end ; but the preacher sets aside all thought of property accumulation and seeks only the good of his fellow-men. The lawyer and the physician may have an earnest desire to do good to others, and may take great satisfaction in righting wrong and healing the sick ; but yet righting wrong and healing the sick are not their chief aim. It is not for those objects that they entered on the study of their profession. It was to make money. The few exceptions to this cannot modify the statement. We speak of the general character of these professions."

It has been well said that "everything which contains the results of human life, that speaks of human activity, spirit, energy, or wisdom, is thereby and in that proportion dignified. This is why we attach the idea to a beautiful structure more than to the rough stone out of which it was hewn ; to the stately ship more than to the timber lying on the wharf. The dignity of labor means the dignity of the laborer, reflected in his performance."

A due consideration of mutual dependence and mutual obligation—of the law of service to each other growing out of the law of association ; the recognition of help received and the readiness to encourage and help in return ; the perception that professional relationship means not alone benefits to be gained but benefits to be conferred—these are the essential spirit of professional ethics ; these form the foundation for a claim to professional status. The state of mind which leads one to "prefer the good of another to his own benefit" is the expression of the highest development of human character ; it is an attainment of the individual soul if attained at all, and comes not by the receiving of a degree nor by professional fellowship ; and, while it is to be coveted and admired, it cannot be required as the *essential* spirit of professional ethics.

The public is quick to recognize and to appreciate professional qualification and worth ; equally quick to recognize and to estimate at their true value assertions of superiority, whether in the possession of a heavenly spirit or of superlative knowledge or skill. Cant, religious or professional, is always distasteful. "I am holier than thou" is said to have provoked Omnipotence. The essential spirit of cant is an assumption of superiority,—always offensive, sure to awaken a feeling of resentment in human nature, to destroy confidence and weaken influence.

THE IDEAL AND THE PRACTICAL.

It is related that at the dedication of the great Temple which Solomon had built a feast was given in honor of its completion. The king noticing the iron-worker among the guests asked with a show of displeasure, "What dost *thou* here?" To which the iron-worker responded, "I understood the feast to be in honor of all who contributed to the building of the Temple." "But," replied the king, "thou didst no work upon the Temple." "True," admitted the iron-worker, "but I made the tools with which all these men worked, and without which there could have been no progress."

The lesson of the story is that the forces of the mental and manual workshops of the world must in the very nature of things be mutually helpful—must be harmonious in their aims. The professional and industrial ideas must be pursued on the same plane of progress to the same goal of perfection.

A SUPREME COURT DECISION UPON DENTAL LEGISLATION.

The Supreme Court of Minnesota, at its October term, rendered an elaborate opinion as to the constitutionality of the Minnesota law governing the practice of dentistry in that State in the case of the State *vs.* Geert A. Vandersluis, appellant. As this is, we believe, the first time that the Supreme Court of any State has been called on to pass upon these questions, the decision is of interest to the profession at large. We therefore present it in full :

That the legislature may prescribe such reasonable conditions upon the right to practice medicine or law as will exclude from the practice those who are unfitted for it, is so well settled by decisions of the courts as to be no longer an open question. The power rests on the right to protect the public against the injurious consequences likely to result from allowing persons to practice those professions who do not possess the special qualifications essential to enable the practitioner to practice the profession with safety to those who employ him. The same reasons apply with equal force to the profession of dentistry, which is but a branch of the medical profession. That in the exercise of that power the legislature may require as a condition of the right to practice that the person shall procure a license, may designate some officer or board to issue the license and to determine whether an applicant possesses the qualifications required to entitle him to it, and may prescribe, so far as can be done by a special law, what qualifications shall be required and how the possession of them by the applicant shall be ascertained, necessarily follows from the power itself.

It is for the legislature and not for the courts to determine those things. The only limit to the legislative power to prescribe conditions to the right to practice in a profession, is that they shall be reasonable. Whether they are reasonable, that is, whether the legislature has gone beyond the proper limits of its power, the courts must judge. By the term reasonable we do not mean expedient, nor do we mean that the conditions must be such as the court would impose if it were called upon to prescribe what should be the conditions. They are to be deemed reasonable, where, although perhaps not the wisest and best that might be adopted, they are fit and appropriate to the end in view, to wit, the protection of the public, and are manifestly adopted in good faith for that purpose. If a condition should be clearly arbitrary and capricious, if no reason with reference to the end in view could be assigned for it, and especially if it appeared that it must have been adopted for some other purpose, such, for instance, as to favor or benefit some persons or class of persons, it certainly would not be reasonable, and would be beyond the power of the legislature to impose.

In 1885 the legislature passed an act to regulate the practice of dentistry. Ch. 199, Laws 1885. This act continued in force until it was superseded and repealed by Ch. 19, Laws 1889. The latter act is assailed as unconstitutional. Though the act of 1885 is not called in question, we think it well to refer to some of its provisions. Section 1 made it unlawful for any person not at the passage of the act engaged in the practice of dentistry in the State to commence such practice without a certificate as in the act provided. Section 5 provided for the certificate, which was to be issued by the board of examiners provided for in the act, upon a satisfactory examination. Section 4 made it the duty of every person at the time engaged in the practice of dentistry in the State to within six months after the passage of the act cause his name and residence or place of business to be registered with the board in a book to be kept by it for that purpose, provided that every person so registered is a practitioner of dentistry and might continue to practice as such.

Chapter 19, Laws 1889, section 1, provides that from and after September 1, 1889, it shall be unlawful for any person to practice dentistry in the State unless he shall first have obtained a certificate of registration and filed the same or a certified copy thereof with the clerk of the district court of the county of his residence, as in the act afterwards provided. Sections 2 and 3 provide for a board of examiners. Section 4 makes it the duty of the board to transfer to a register to be kept by it for that purpose, within ten days after the second Tuesday in July, 1889, the name, residence, and place of business of each and every person who on the second Wednesday in July, 1889, pursuant to the act of 1885, shall be qualified to practice dentistry in the State and who shall then be duly registered on the books of the board created by the act of 1885, and makes it the duty of the board to send to each of such persons a certificate of his registration.

It will be seen from these various provisions that those qualified to practice dentistry under the law of 1885 continued to be so qualified under the act of 1889, including both those who were in practice at the date of the former act and registered as it required, and those who became qualified by the examination and certificate provided by it.

Section 5 of the act of 1889, the provisions of which furnish one of the grounds on which appellant assails the act as unconstitutional, provides that any person who shall desire to begin the practice of dentistry in the State after September 1, 1889, shall make application for examination to the board of examiners, paying a fee of ten dollars, and shall undergo an examination. The section further enacts: "In order to be eligible for such examinations such person shall present to said board his diploma from some dental college in good standing and shall give satisfactory evidence of his right to the possession of the same ; provided also that the board may in its discretion admit to examination such other persons as shall give satisfactory evidence of having been engaged in the practice of dentistry ten years prior to the date of the passage of this act.

"Said board shall have the power to determine the good standing of any college or colleges from which such diplomas may have been granted." It then goes on to prescribe the manner, extent, and subjects of the examinations.

What particular objections, of a constitutional character, the appellant makes to this section it is somewhat difficult to tell from his brief. We infer, however, that he claims the section to be objectionable because, no matter how well qualified by learning and skill or experience one may be, he has no absolute right to be examined by the board unless he has a diploma from a dental college in good standing, such good standing to be determined by the board, and this he claims to be a discrimination between the rich and poor, because one may be pecuniarily able and the other not able to attend a dental college. The mere fact of discrimination in such a law is no objection to it. Requiring a certain degree of learning and skill as a condition of being allowed to practice is discrimination between those who have and those who have not that degree of learning and skill, between those who are able and those who are unable to acquire it.

If there were discriminations between persons or classes upon any matter not pertinent to the legitimate purpose of the law, to wit. to secure fitness and competency in those who shall be permitted to practice, it would be objectionable. As, for instance, if it were as to place of birth, color, or religious belief. The requirement of a diploma from some college or learned society in order to practice medicine has been inserted into the laws of many States and questioned in but few. In Massachusetts a law required the practitioner to have been licensed by the Medical Society, or been graduated a doctor in medicine at Harvard University. This was held constitutional in Hewitt *vs.* Charier, 16 Pick. 356. The statute of Nevada (1875) required a medical education and a diploma from some regularly chartered medical school. This was held constitutional—*Ex parte* spinney, 10 Nev. 323. As the fact of having graduated at and received a diploma from a school or college devoted to teaching the particular science, medicine, surgery, or dentistry, bears directly upon the person's qualifications to practice, we have no doubt the legislature might have made that the sole test.

That this statute allows, in the discretion of the board, ten years' practice, prior to the passage of the act, as a substitute for the diploma of a college, furnishes no objections on constitutional grounds to the act. True, it is asked why ten years' practice after the passage of the act ought not to entitle one to the same right as ten years' practice before its passage. A sufficient answer to this is that such practice after the act, if in this State, would be in violation of law, and the legislature surely may provide against inviting violations of the law, and for that purpose withhold all benefit from its violators.

It is objected that it is left to the discretion of the board to determine whether ten years' practice, instead of a diploma, shall admit one to examinations. On the score of expediency some questions might be made upon it. But as the legislature might have left that provision out altogether and made no exception to the requirement that an applicant for examination should have a diploma, we do not see that any questions can be made of the power to fix the period of ten years, nor of the power to leave it for the board to determine in each particular case whether the extent and character of the applicant's practice during the period has been such as to be equal as evidence of his qualifications to the possession of a diploma.

Section 7 reads, "All persons shall be said to be practicing dentistry within the meaning of this act who shall for a fee or salary or other reward paid either to himself or to another person for operations or parts of operations of any kind treat diseases or lesions of the human teeth or jaws, or correct malpositions thereof. But nothing in this act contained shall be taken to apply to acts of *bona fide* students of dentistry done in the pursuit of clinical advantages under the direct supervision of a preceptor or a licensed dentist in this State during the period of their enrollment in a dental college and attendance upon a regular uninterrupted course in such college."

It is claimed that this shows the law to be an arbitrary measure for the benefit of dentists by giving them a monopoly to practice a branch of surgery which has heretofore been largely carried on by regular physicians and surgeons.

It was proper in order to give precision to the law to define what was meant by practicing dentistry. It is not, however, to be supposed the legislature intended to enlarge the sphere of the profession. There may be diseases of hurts to and operations upon the jaws that are within the legitimate profession both of the general surgeon and of the dentist. We do not know how this is. But if it be so, the licensed surgeon would be protected by his license in treating such. The act before us could hardly be so construed as to limit the right of the surgeon under his license.

It is claimed also that it discriminates between students of dentistry by allowing them to operate upon the teeth and jaws during the period of their enrollment in a dental college and attendance upon a regular uninterrupted course in such college, and excluding others. The purpose of this provision of the law is apparent. It is to permit to actual *bona fide* students the benefit of practical work under an instructor. But to prevent evasions of the law by persons practicing the profession under the pretense of being students the act very properly defines who shall be regarded as students within the clause allowing them to perform operations or parts of operations. It is open to every student to bring himself within the definition.

The interpretation of the clause under consideration, upon which appellant argues that it was intended to prefer schools of dentistry within the State as against those out of it, is too narrow. We see no reason why a student in such a school in another State may not during vacation pursue his studies here under a licensed dentist and be within the meaning of the clause. By "regular uninterrupted course" the act does not mean a course in which there are no vacations, such as all schools have. To hold that it does would lead to this unreasonable result: that the student even in a school in this State might during the term have the benefit of practice in operations under a licensed dentist, but would have to suspend as soon as the term should close.

The provisions and requirements of the law are undoubtedly rigorous. They ought to be in any law aiming to protect the public against ignorance and incompetency in so important a profession as the medical profession in any of its branches. We see nothing in the provisions of this law that was not clearly inserted by the legislature in good faith to effect the end in view. The law is valid. Judgment affirmed.

BIBLIOGRAPHICAL.

VERHANDLUNGEN DER DEUTSCHEN ODONTOLOGISCHEN GESELLSCHAFT. Band I. Heft I. Berlin, 1889.

This report of the proceedings of the German Odontological Society contains much of interest. In this first volume are to be found various articles by members who have an international reputation. Indeed, the active working members of this organization are familiar to all readers of German dental literature.

Prof. Hollender opens with a paper on "Erosion of the Teeth," and the subject is handled with his usual ability; but he leaves his readers very much in the dark as to the cause, nor did the discussion throw much light upon it.

Dr. Adolf Weil follows with a paper on "The Nomenclature of Dentistry." This subject is ably treated by one of the brightest and best-trained men in the German ranks; but it seems a waste of time and intellectual strength to attempt to improve the technical language of dentistry. It is doubtless true that America is responsible for many unscientific terms in this connection; but efforts to remedy this, however well meant, only increase the confusion already existing. Notwithstanding Dr. Arkövy's fearful onslaught (quoted by Weil), the American mind is not likely to accept his (Arkövy's) idea of nomenclature, with his description of fifteen different pathological conditions of the pulp from "*Pulpitis acuta septica s. superficialis*" to "*Dissolutio pulpæ absoluta*" (vide "Diagnostik der Zahnkrankheiten"), and in all likelihood the "*abhorrent flood* [dental literature] *will bury the entire profession in its mud*" (Arkövy) before the slow process of evolution brings about a change. The whole tendency of the general as well as the scientific mind is toward directness and simplicity of expression, and this is particularly true of English-speaking peoples, and mere personal antagonism will not change this current in a direction toward the conservatism of the Middle Ages.

Prof. W. D. Miller has a paper on the "Method of Determining the Antiseptic Action of Filling-Materials." This paper, enlarged, was given to the readers of the December (1889) COSMOS.

Prof. Busch presents an elaborate and fully illustrated paper on the "Wounding, Abscesses, etc., on the Tusks of the Elephant." This is an extremely interesting article. J. T.

PATHOLOGISCHE ERSCHEINUNGEN AM ELFENBEIN. Von Prof. Dr. W. D. MILLER, Berlin.

This is a paper separately printed from *Deutschen Monatsschrift für Zahnheilkunde*, 1889, and covers the writer's views on the pathological appearances in ivory. It is very beautifully illustrated. J. T.

OBITUARY.

DR. WILLIAM M. HUNTER.

DIED, at Cincinnati, Ohio, November 25, 1889, WILLIAM M. HUNTER, D.D.S., in the seventieth year of his age.

Dr. Hunter was born in Louisville, Ky., December 25, 1819. His early life was passed in Philadelphia, Pa., where he studied dentistry with Dr. Elijah Neall. In 1842 he went to Cincinnati, where, with the exception of the years 1864 to 1867, which were spent in New York City, he was in active dental practice until in his later years, through increasing infirmities, the practice became somewhat desultory; but his surprisingly vigorous physical endowment kept him out of bed up to within a few days of his quiet and painless passing away.

He was married in 1844, at Philadelphia, to Miss Caroline Ashton. They had four children, two dying in infancy. Mrs. Hunter, Dr. Frank A. Hunter, and Miss Clara Hunter are yet living in Cincinnati, where the son has high rank as a dentist, and the daughter is widely known in educational circles.

Dr. Hunter was mentally and mechanically well equipped for a prominent position in both the operative and prosthetic departments of dentistry. He gave especial attention, however, to the devising of improvements in artificial dentures, and claimed to have been the first to make a practical case of continuous-gum work. His controversial contributions to the literature of that subject will be remembered by all dentists of that period. He also claimed to have originated the formula from which the alloy known as Dr. Townsend's amalgam was made.

Lack of space alone prevents the recall of many noteworthy incidents in the life of one of the practical pioneers in the practice of dentistry.

DR. HORACE A. BOWERS.

DIED, at Nashua, N. H., December 8, 1889, HORACE A. BOWERS, D.D.S., in the twenty-fifth year of his age.

Dr. Bowers was born in Springfield, Vt., December 15, 1863. He graduated from the high school, in Nashua, in 1881, studied dentistry with his father, Dr. George Bowers (who is a prominent practitioner in Nashua, N. H.), and graduated from the dental department of the University of Pennsylvania in 1884. For a time Dr. Bowers was located in Holyoke, Mass. Ill health made it necessary for him to remove to Nashua, where he has, until his untimely death, been associated with his father in conducting a first-class practice. Professionally, Dr. Bowers was highly esteemed; in his college work he led his class, and in practice he aimed at the highest mark of perfection and did all in his power to keep the standard of dentistry high. As an operator, Dr. Bowers was very skillful in gold work and had acquired a good knowledge of modern crown- and bridge-work. He was an active member of the Connecticut Valley Dental Society. Socially, he was one of the most genial young men, without an enemy in the world. All who knew him loved him. He was prominent in the highest circles of society in the city in which he lived, and is deeply mourned by a very large circle of friends.

DR. JACOB CARR.

DIED, at Findlay, Ohio, of diabetes, DR. JACOB CARR, in the seventy-second year of his age.

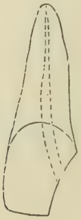
Dr. Carr was born in Franklin, N. H. He received a classical education, and in 1840 commenced the practice of dentistry in Findlay. He was elected to the mayoralty of the city for seven terms, serving for fourteen years in that capacity. During the war he held the position of provost-marshal. He was admitted to the bar, but never practiced law. He was a man of fine attainments, a trained civil engineer, and an excellent metallurgist.

HINTS AND QUERIES.

RESTORATION OF CROWNS.—I have used cohesive gold for restoring broken points and contouring bicuspids and molars, and found, no matter how well executed, there would be disintegration in a few years. I abandoned this system as far as possible, and substituted porcelain points instead, as described by me in an article published in the COSMOS some years ago. It met with sufficient favor to be given a place in the revised edition of Harris's Principles and Practice of Dentistry.

I found this system more beautiful than lasting, as the porcelain points, like pivot teeth, will sometimes break off. I now use the following system, which I began about four years ago, sometimes using the porcelain points with it, and have found it the most satisfactory I have yet used, both to my patients and myself. It is not so fatiguing, as it requires less time, nor does it become loose or disintegrate. In fact, it will last as long as the tooth in which it is used. The accompanying cuts will illustrate the method very clearly.

Fig. 1 represents a central with the corner to be restored. I take a thin piece of pure gold plate and bend it to fit the side of the tooth, giving it as near as possible the shape the tooth should have when finished, then solder to this a bar of pure gold to serve as the cutting-edge; it should be thick and broad enough to allow for the proper shaping and finishing of the tooth when it is secured in position. Gold coin can be used as solder, but I let the bar extend beyond the plate, or let the plate pass beyond the bar and fuse the ends until they unite. By doing this the appearance of solder is avoided. When it is admissible, with a proper size twist-drill I bore a hole down the root-canal to sufficient depth to hold the piece firmly when once in position. This is accomplished by fitting an iridiumized platinum wire loosely into the hole in the root-canal, and bending and cutting it of sufficient length to come exactly in contact with the gold plate when in proper position. Next thoroughly dry the tooth, insert the wire, and put some sticking wax, that will break rather than move its position, on the gold plate, warm it over a lamp, and put it into place. It may be necessary also to place a hot flat burnisher on the outside of the gold plate to heat the wax so it will adhere to the pin. Then draw the gold plate out carefully to prevent detaching it from the pin, and invest in a drop of plaster to hold the pin in position while soldering. It is not necessary to use sand, and the smaller the quantity of plaster the sooner the soldering is done. For this I use 20-carat gold, and flow sufficient on the gold plate to make it quite rigid. It may be further strengthened by soldering a small platinum pin to the middle of the bar that serves for the cutting-edge and to the pin that goes into the root. When there is any retention in the tooth at the cutting-edge, this also gives an additional anchorage, as the cement has a projection to which it holds. This little pin also prevents the bar, which is very soft, from opening when filling in against it. We now have the piece ready to put in place as in Fig. 2. Dry the tooth and the piece, and put into position with Poulson cement. I prefer this cement for such work on account of its great hardness and tenacity. When the cement has hardened, I excavate it from between the tooth and gold, from the lingual surface, beginning at the anterior cervical wall, and continue over the cutting-edge to sufficient depth to secure gold or amalgam. I generally use the latter, as the quantity is too small to be seen or to discolor the tooth. I find that submarine amalgam is best at the cervical wall, and contour on the cutting-edge. When sufficiently hard I excavate the labial surface and fill the space with gold, and we have Fig. 3. Fig. 4 is a central I arranged with a living nerve; Fig. 5 the piece. Fig. 6 represents the tooth when finished. In Fig. 7 I fitted a piece of porcelain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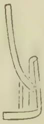
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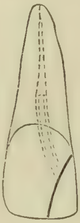
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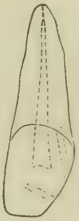
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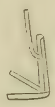
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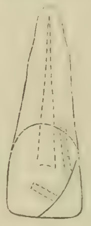
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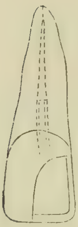
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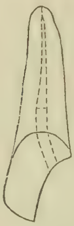
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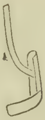
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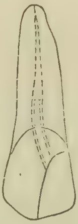
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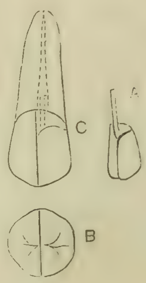

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in the open space and secured it with cement, and burnished the gold plate of the labial edge over the edge of the piece of porcelain, as a diamond in a solid setting. This holds the piece firmly, but must be done before the cement hardens, and the piece of porcelain must be slightly beveled to the labial surface. This is the most beautiful operation when artistically executed. Fig. 8 is a cuspid, Fig. 9 the point, Fig. 10 as finished. Fig. 11 is a bicuspid with half of the tooth gone. I bend a piece of gold and solder a pin in position as in Fig. A, put it into position with cement as in Fig. C, excavate first the part to be filled in with amalgam, and then contour the cusps with gold as seen in Fig. B.

This system can be applied in various ways. It is exceedingly useful in very large approximal cavities, and in half-moon-shaped cavities in the centrals, laterals, and cuspids, as the teeth are made stronger by being filled with cement, leaving a simple cavity to be filled around with gold or amalgam. The frailest teeth can be filled with gold in this way.—S. D. RAMBO, D.D.S., Rio de Janeiro.

DIAMOND TREPHINES FOR PORCELAIN INLAYING.—Undoubtedly the most artistic filling which can be made is the porcelain inlay; and in cavities on the labial surface of the anterior teeth this line of work would seem to be especially applicable on account of the conspicuousness of even a small gold filling in such a position. A porcelain inlay, to give the best results, should fit the cavity with the utmost accuracy, and be of the exact color and shade of the tooth to be filled. As the different portions of a natural tooth vary in color and shade, it often occurs that an inlay requires to be darker in one part than in another, and in no way can we accomplish this end so correctly as by cutting the inlay from an artificial tooth which has been closely matched to the natural one, using that portion of it which corresponds to the part to be filled. How difficult and precise an operation it is to grind a tooth down to fit a cavity, only those who have done it can know; and not the least troublesome part of the operation is the difficulty in holding such a small piece of porcelain while it is being ground. The time consumed is so far in excess of the advantageous results obtained that few operators adopt this method.

FIG. 1.

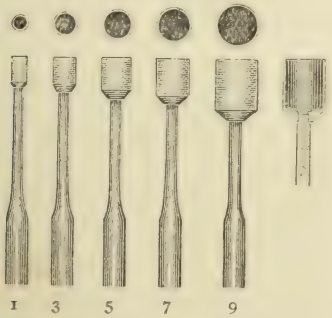
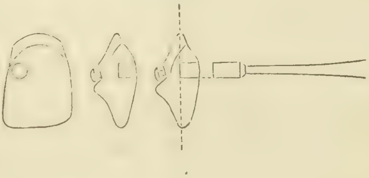


FIG. 2.



In order to facilitate this operation I have devised a set of diamond-charged trephines (Fig. 1) for cutting circular inlays of different sizes from any portion of a porcelain tooth,—a circular form being the most easily fitted, and in a large majority of cases which come under our notice the cavity can be cut to this shape.

By means of these trephines, which are made in the same manner as the diamond disks, any old, otherwise useless, porcelain tooth may be utilized, and by placing a small piece of cork, rubber, or wood inside the trephine, allowing the instrument to cut only a given depth, we can have the inlay the exact thickness required. Then in grinding the back portion of the tooth,—behind the dotted line,—(Fig. 2) away on the lathe we have something to handle,—something large enough to get hold of until the grinding is completed. By shaping the cavity with wheel-burs (Fig. 3) of exactly the same size as the inlays, we secure an accurate fit (Fig. 4), and, if every part of the operation has been carefully performed, there should be no necessity of trimming after the inlay is set, and in this way we retain intact the smooth and finished surface of the porcelain.

Fig. 3.

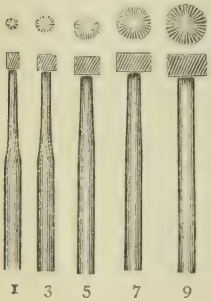


Fig. 4.

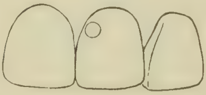
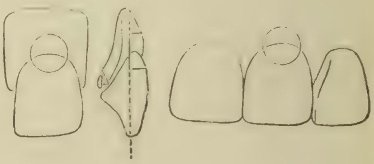


Fig. 5.



When a cavity of decay extends below the gum on the labial surface of a tooth, a very satisfactory result may be obtained by cutting an inlay from a gum tooth in such a way that a portion of the gum festoon may be included (Fig. 5). Very often the entire inlay may be cut from the gum-colored portion. Many oblong-shaped cavities can be fitted with two small circular inlays placed side by side and carefully jointed at the point of contact.—Geo. H. Weagant, L.D.S., Cornwall, Ontario, Canada.

A New Bing Bridge.—The setting of an ordinary Bing bridge between any of the oral teeth is both troublesome and unsatisfactory because of the difficulty of building the wings into the natural teeth, the sides of which fit so close to the bridge-tooth that there is not room for filling around the wings on the labial sides of the cavities. It has therefore occurred to me to make the backing and wings in a single separate piece, which can be first anchored in the abutment teeth, and the bridge-tooth be then fastened to the backing.

The illustrations will aid in making the method obvious. Fig. 1 shows the backing and wings for a porcelain central,—in this instance the How four-pin crown (Fig. 2) is employed, and put in place with the wings extending into the prepared cavities in the natural central and lateral. It will be seen that a hollow or walled-in backing has been made, and pin-holes punched to receive the pins of the crown, which has been ground and fitted so as to exactly fill the space between the teeth and rest closely on the gum. The backing, however, does not quite touch the gum. The rubber-dam is put on the adjacent teeth, the How crown and its backing put in place as in Fig. 3, and some softened modelling composition pressed carefully against the backing and the backs of the anchor teeth, being careful to keep the warm composition away from the rubber-dam. When the composition has become quite hard, and while it is held with the fingers firmly in place, press some softened modelling composition over the face of the bridge-tooth and its neighbors, and when the composition has become quite cool remove it, and the bridge-tooth with it.

Still retaining the inside piece of composition, and with the fingers holding it firmly in place, the wings of the bridge may be built in with gold on the labial sides of the cavities, to which this method affords free access. After those sides have been filled, the bridge-tooth is to be put in place, the outside piece of composition put on, and the inside composition carefully taken away without displacing the backing, which will then be firmly supported by the outside composition, as is shown by Fig. 4. The palatine walls of the cavities may then be filled with gold to surround and secure the wings of the bridge. When this has been done, the ends of the crown-pins may be bent down on the backing and the bridge-box be filled with gold, or with gutta-percha, or cement. The external appearance of the case will be like that shown by Fig. 5.

FIG. 1.

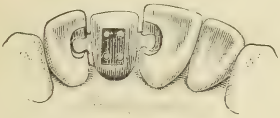


FIG. 2.

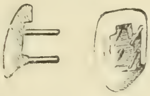


FIG. 3.

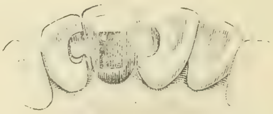


FIG. 4.

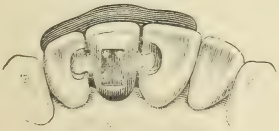
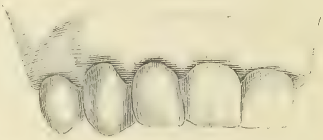


FIG. 5.



The advantages of the method are a clear view of and complete access to both sides of the cavities while building in the bridge-backing, and the readiness with which another crown can be fixed on the backing in case the first one should be inadvertently broken or forced off. The mounting is so solid that this is not likely to occur; but in the single instance of my experience the second crown was very quickly and firmly attached.—John S. Thompson, D.D.S., Atlanta, Ga.

Root-Filling.—Situated at a summer resort, I have the opportunity of seeing the work of operators in all parts of the world, and I have been surprised by the defective work coming from the hands of first-class dentists. I rarely find odorless roots where they have been dressed with either cotton or gutta-percha, and I consider that where there is a trace of an odor the root is imperfectly filled. I have had occasion to open a great many roots that have been filled with chloro-percha, and have always found more or less of an odor present. The very nature of the material permits the absorption of any gases that may be present in the dental tubuli, and this is particularly noticeable where an evaporation of the liquid part of the material has taken place.

It is absolutely essential that the apical foramen should be hermetically sealed in order to prevent the accumulation and the pericemental irritation caused by the exit through the foramen of any gases. I experimented for several years with different methods of dressing roots, and had more or less success, generally less, until I tried the closing of the foramen with an orange-wood point. I have in this manner opened several roots that have been sealed up for two years, and they were as odorless as on the day the dressing was inserted, and I have never known of the recurrence of an abscess from a root so treated. Some operators may consider it unscientific, but I think that any method that promises almost a sure means of success should not be condemned because it may be termed non-scientific. My method of procedure is as follows: Open up the root freely by the use of proper-sized burs, always cutting as much tooth-structure as is necessary to allow of free access to the root, and then with a small-sized suitable nerve-drill follow the nerve-canal until the patient gives warning that it is upon sensitive structure. If by any reason the drill passes through the end of the root (which should be carefully avoided), an abscess is sure to follow after the root is closed up. When the canal has been thoroughly disinfected with carbolic acid until all trace of septic gases has been destroyed, dry it with hot air, after which an orange-wood stick is shaped and pointed as near the form and diameter of the apical portion of the root-canal as possible; then, with a sharp knife, a circular cut is made, not quite through, at an eighth to a sixteenth of an inch from the point. After dipping in carbolic acid, gently tap until there is a solid sound, and then twist off the point, leaving it firmly and tightly fixed in the canal. As an intermediate filling I use a twisted fiber of cotton, saturated with a thin paste of hydronaphthol and glycerine packed in as tightly as possible, and over that a solid foundation is made of oxychloride of zinc for the filling proper.—L. N. Seymour, D.D.S., Asbury Park, N. J.

Dental Anomaly Extraordinary.—A young lady of about eighteen years presented a case in which the superior teeth appeared as shown in Fig. 1.

Fig. 1.

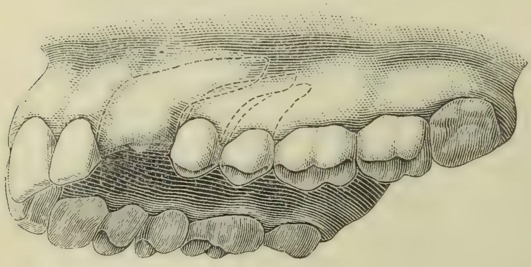
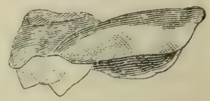


Fig. 2.



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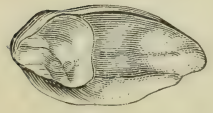

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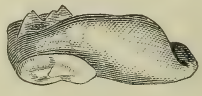
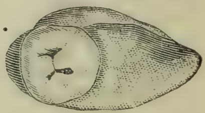


Fig. 5.



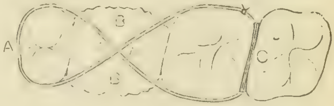
The inferior teeth were normal in number less the third molars, and were regular in character, arrangement, and articulation. From the superior maxilla somewhat more than a year previous to her present appearance, November 15, 1889, I had extracted the badly-decayed first molar of the right side. Without any artificial aid, the second molar came forward against the bicuspid and the third molar erupted in the place of the second, as is apparent in the illustration. At that time the place of the left cuspid was vacant, but a decided prominence was noticeable in that region, and there was ample space for its hoped-for though very tardy eruption. There ensued, however, a local disturbance which led her to seek relief, and she readily consented to the extraction which was advised as the only then feasible mode of meeting the indications. Much difficulty was experienced in removing the tooth, which offered remarkable resistance to traction in the usual directions ; but as it seemed in some degree yielding to outward pressure, a combined right rotatory, with a down and outward pull, brought away safely the most surprising dental anomaly that I have seen in the course of many years' practice. A buccal view is given in Fig. 2, an under side view in Fig. 3, a palatine view in Fig. 4, and an upper side view in Fig. 5. The specimen itself must be inspected to gain an adequate idea of the anomaly. There appear to be two bicuspids, the roots of which are reversely everted and gemmated, or blended, while the two crowns are united in reverse opposition, as may be seen in Figs. 2 and 4.

Not the least remarkable fact is the removal of the mass without any considerable loosening of the normal-appearing bicuspids, under which the anomaly lay as indicated by the dotted lines of Fig. 1, which likewise point out the deflection of the remaining bicuspid roots as revealed by careful exploration with a thin probe. The model is from an impression taken five days after the extraction, and shows on that side nothing more unusual than would be apparent after the extraction of an ordinary cuspid.

The operation afforded immediate relief, and the remaining bicuspids were without intermission capable of painless service in mastication.

The history of the patient and her family discloses no variation from a type of remarkably uncontaminated and robust healthfulness. Heredity seems, therefore, to be out of the question in an effort to discover a probable cause for this extremely singular aberration. The specimen will, however, be subjected to expert inspection with the view of so far as possible making a complete record of the case.—Dr. J. E. Freeston, Pottsville, Pa.

Ligated Compress.—For a male patient, aged nineteen years, a superior left first molar was extracted November 9, 1889. About fourteen hours afterwards there occurred a secondary hemorrhage, which continued twenty-four hours before he returned to me for relief. I made of styptic cotton a suitable compact cover for the open alveolus, and, by means of linen thread around the adjacent teeth and crossing as at A A over the cotton B B, shown in the illustration, there was produced a complete compress, which could not be disturbed in the acts of talking or mastication, and in neither case occasioned any inconvenience. A piece of separating rubber, C, in this instance prevented the ligature from slipping off the second molar, but is not usually necessary.



The novel ligated compress was removed twenty-four hours subsequently, and there was no recurrence of the hemorrhage.—Edward H. Sears, D.D.S., New Brighton, Staten Island, N. Y.

Safe-Side Burs.—The labio-cervical cavities in the oral teeth are among the most troublesome that the dentist is called upon to prepare for fillings, especially when these cavities are shallow and extremely sensitive. This sensitiveness, as we all know, inheres in the peripheral and tenuous zone between the dentine and enamel; hence, in deepening one of these cavities, it is desirable to pass as quickly as possible through that zone, and, while cutting deeper, still avoid the lateral abrasion incident to the use of a bur which cuts on its side, as the wheel or inverted cone bur. On the contrary, the smooth wall of the safe-side bur, which cuts only at its end, does not act abrasively on the sensitive-zone margin after the cutting end has passed through the zone to further deepen the cavity, and the operation is by so much the less painful as compared with the other common modes.

It is, moreover, important to preserve the thin lateral wall of enamel on one or both sides of a cavity of this class, and it is by no means an unusual occurrence for the rapidly-rotating side-cutting bur to run away with the hand-piece and destroy the enamel matrix on either side. With the safe-side bur, however, there is no risk whatever; but the cavity may be formed perfectly close up to the egg-shell wall with safety beyond a peradventure. A retaining reliance for the filling must of course be found in the proper under-cutting of the respective outer and inner walls of the cavity, and with a small wheel-bur such cutting can be done just beneath the sensitive zone of the properly-deepened cavity without the infliction of much, if any, pain. There are other excellent uses for these safe-side burs to which attention may be again directed, if the COSMOS editor will kindly afford me space.—D. D. S.

SECTIONS FOR MICROSCOPE SLIDES.—It is often a very difficult matter to cut a section from a natural tooth-crown, the enamel of which will resist any but the hardest steel saws. The improved diamond disk will, however, readily slice up a tooth in any direction, and thus many sections may be made from the same tooth, or indeed from any hard specimen that is not too large for the disk. Of course this is to be kept wet while revolving, and only the slightest pressure is to be used, for the disk cuts faster if lightly fed up to the work. The time and labor of cutting thin sections is greatly lessened by means of these disks, to say nothing of obtaining adjacent sections from the same specimen; and this is of especial advantage in carious teeth, which may by this means be sliced across cavities having very thin walls.—W. S. H.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I have noticed, in a recent number of the *Popular Science News*, the statement, on the authority of two French practitioners, that the extraction of a tooth may be rendered painless by spraying the neighborhood of the external ear with ether, the anesthesia of the trigeminus thus produced extending to the dental nerve. If this should be found true, and to be free from objection as to any injury to the ear, it would render the production of general anesthesia for tooth-extraction needless, and might also prove of great value in cases of extremely sensitive dentine.—T. F. U.

WILL some one kindly inform me how the dental laws have been interpreted regarding the qualifications of one operating as an assistant for a qualified dentist? Is it necessary that the assistant shall have a license? Also, must one who does only laboratory work, not coming in contact at all with patients, have a license?—NEB.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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THE

DENTAL COSMOS.

VOL. XXXII. PHILADELPHIA, MARCH, 1890. NO. 3.

ORIGINAL COMMUNICATIONS.

THE EXPRESSIONAL SERVICES PERFORMED BY THE FACE.

BY A. H. THOMPSON, D.D.S., TOPEKA, KANSAS.

(Concluded from page 91.)

"There are mystically in our faces certain characteristics which carry in them the motto of our souls."—SIR THOMAS BROWNE.

THE expressional duty of the face is to symbolize character. In common with the physiognomical functions of other parts of the body, the face assists in symbolizing the man and depicts him as he is in unmistakable signs. It is superior to them also in that it is the especial messenger of the emotions and exaggerates the manifestations of character which the less effective parts merely indicate. The other parts bear a passive share in this symbolical work, but the face is active and aggressive. The symbols are not occult and secret and known only to the initiated, but are so open and plain that even a child may read and know plainly and simply the heart of the wearer of them. Of course experience and long and close observation of men increases the skill of and facility in reading faces aright; but yet the power is instinctive in all men, for it is born with them and is exercised unconsciously from the cradle. "I am much of Lavater's opinion," says Cowper, "and am persuaded that faces are as legible as books and are read in much less time and are less likely to deceive us; in fact, I cannot recollect that my skill in physiognomy ever deceived me."

The accomplishment of reading faces by the outward natural signs and symbols of character is valuable in proportion as men have dealings and intercourse with each other; and in this day of mutual and extensive dependence the faculty is of inestimable worth to all men. As a writer well says, "Knowledge of the world includes the ability to tell or guess well, at sight, what a man is, or will do, or feel, in certain events. It comprehends a swift and intuitive perception of character as displayed in form, and such a perception as penetrates far beneath the surface of emotional expression right into the foundation forms in which are the true symbols of the mind's nature." Or as Henry Fielding puts it, "I conceive the passions of men do commonly imprint sufficient marks on the countenance, and it is owing chiefly to the want of skill in the observer that physiognomy is of so little credit in the world. . . . If Mrs. Tow-wouse," he writes again in "Joseph Andrews," "had given no utterance to the sweetness of her temper, nature had taken such pains in her countenance that Hogarth himself never gave more expression to a picture." Noble old Bacon hath it, that "the lineaments of the body do disclose the disposition and mind in general; but the motions of the countenance do not only so, but do further disclose the present humor and state of the mind and will. Although physiognomy and related sciences have of late years been used to be coupled with superstitious and fantastical arts, yet, being purged and restored to their true state, have a solid ground in nature and are profitable in life." But Lavater, dear, delightful old charlatan that he is, in spite of his sentimental assumption of character and mind-reading power and his fantastic use of physiognomy, has much to say that is of value and interest, when his voluminous observations can be culled of his intuitive and self-evolved philosophy. He says, truthfully ("Physiognomy," 1783), "He is a weak and simple person who affirms that all faces affect him alike. . . . The eye, the look, the cheek, the mouth, the forehead,—whether considered in a state of rest or during their innumerable varieties of action,—whatever is understood by physiognomy, are the most expressive, the most convincing picture of interior sensations, theories, passions, will,—in fine, of all those properties which exalt moral above animal life. . . . The moral life of man reveals itself in the lines, marks, and transitions of the countenance. His moral powers and desires, sympathies and antipathies, are summed up in and painted upon his countenance when at rest. . . . Physiognomy is the science or knowledge of the correspondence between the external and internal man,—the visible superficies and invisible contents. It is, properly so called, the observation of character at rest, which is displayed in the form of the solid and appearance of the movable parts while at rest. Character impassioned is manifested by the movable parts in motion." Many grains of truth and reason may be gathered from the pseudo-scientist's ramblings, but the gathering requires the winnowing out of a deal of chaff. He has been the subject of much vituperation and the butt of much ridicule, and experienced not a little of it in his lifetime. In replying to these scoffers, he well says, "The human countenance, that mirror of Divinity, that noblest of the works of the Creator,—shall not motive and action, shall not correspondence between the interior and the exterior, the visible and invisible, the cause and effect, be there apparent?" Or again, "All men (this is indisputable), absolutely all men, estimate all things whatever by their physiognomy, their exterior superficies. By observing these on every occasion they draw their conclusions concerning their internal properties." Truly no one could dispute such a self-evident truth; but then he goes on and loads it down with such a burden of fantasy about character-reading that, while he disclaims any such intention, he has done little to redeem physiognomy from its degrading association with chiromancy and the occult arts, and it remained what it had been for centuries,—the synonym of quackery and imposture. Yet he wrote a great, if curious, work. It marked an era in the study of physiognomy, although his science is a burlesque and his philosophy a travesty. It has been said that "Lavater was guided in his estimates of character by a rapid intuition, by a kind of restricted perception, and his assurance of truth was but unintelligent conviction." His great work was too popular in style, too pious, and too unsystematic to be of any great value to the world.

The anonymous writer previously quoted again writes that the "whole application of the fine arts to the representation of men is based on the principle that the minds of those who are represented may be indicated by their forms. Let us reflect why it is that works of art affect us, and we will find that it is because we discover in them images of minds. Apprehension of character is expressed in shape, and the minds of persons are depicted in their forms. Artists, in depicting character, often help out designs by adopting either some transient emotion or some action significant of the mind they would portray; but this is not the custom in the highest art: it looks deeper than the emotions and transient actions of men, and seizes the fixed, unchanging forms, because in these it discovers the real symbols of the mind. The admiration of such works contributes to the belief that the interior nature of men is indicated by their external forms. . . . We may derive another argument for it from the probability that the outer form would be designed *on purpose* to represent the mental interior. . . . If the face is made to tell by its undulations the breath that gently moves the surface of the soul, or by its violent expressions the storm that troubles the soul to its very depths, it may surely in its fixed, indelible forms symbolize the permanent characteristics of the man. If we can read in the features the transient or habitual state of the mind, it is probable that the deeper and more abiding characters of the mind should be similarly though less openly declared. . . . We know instinctively the meanings of the transient expressions, because the expressions of the face are the most perfect and generally understood, while those of the fixed form are often difficult to read.''

''To symbolize is not, indeed, the chief object of the construction of the bodily parts, nor of the features of the face. The general law of symbolical construction is that form is made to be significant without interfering with the fitness of parts for other purposes than those of symbolizing.'' In other words, the physiognomical function does not interfere nor conflict with the physiological function, nor *vice versa.* ''The features in which the symbols are most evident, as the lips and nose, have the fitness for breathing, speech, etc., as their primary design. But their being perfect for these purposes does not hinder their having also a symbolical meaning. We might be sure from the general consistency and correlation of all parts of the body, that all would be symbolical if any are ; and that as all minister to one design in the maintenance of the body, so all would be corroborative in their mental testimony. They might differ in the fullness or clearness of expression, but it would be a difference of emphasis, not of language.

''The body and the mind, the sign and the thing signified, do not correspond as effect to cause, but as things derived from a common origin and planned with one design. . . . The Divine mind has made them both according to one idea, and there is perfect congruity between them, and in the visible the invisible is revealed. In this view the study of symbols in the human form is but a branch of that which seeks them in the whole world.'' The argument of design is, in our day, superseded by the principle of evolution ; the mind and body are developed together and both partake, of course, of the hereditary influences which control the growth of both, and both are impressed also by the after-experiences of the individual. ''Men have in all ages been accustomed to symbolize their own ideas, and this is evidence of their consciousness that internal things may be aptly expressed in corporeal form, and they are affected by them as by the ideas which they incorporate. This establishes the antecedent probability of the doctrine of symbols in the human form.

''Thus, certain peculiarities of form and feature are so characteristic of the man, that we naturally call them masculine, while others are essentially feminine, because they are characteristic of woman. These signs symbolize the sexes. Feminine features in a man and masculine features in a woman always reveal a corresponding misplaced cast of mind. So it is with child-like features in adults. So the evident coincidence between national and mental characteristics presents us with a large series of symbolic forms admitting of rational interpretation." But the weakness of the whole system of physiognomical character-reading is in the inherent weakness of this same law of coincidence. A given expression and a given mental or emotional characteristic occurring together in a hundred cases, might, if the observations were extended no further, be taken as revealing a relationship between them, and that they always occurred together. But if another hundred cases were observed, many exceptions to the rule would be found where the expression and the mental peculiarity occurred independently. Of course there are exceptions to all rules; but in physiognomy the exceptions are so numerous that it is unsafe, with all the experience of more than two thousand years, from Aristotle to Darwin, to attempt to formulate a law for character-reading.

"Another series of symbols are those of the likeness of the normal and constant features in some persons to those expressions which more commonly disclose the transient or habitual states of the mind. These transient expressions, as symbols universally acknowledged, by which the natural pantomime of life is carried on, indicate in their ordinary occurrence only the present or passing state of mind. They tell what the mind now is, but by frequent repetition the marks of any of them may become fixed in the features and soon they indicate the acquired character,—they reveal the habitual nature of the mind and tell what the mind has become. But both the transient and habitual expressions must be distinguished from those symbols which, though like them and interpreted by them, are inborn, or which, as the features are gradually fixed, become more marked, even though the disposition which they commonly symbolize may be resisted or by education quite suppressed. For these natural, permanent expressions are among the symbols which tell, not what the mind is or has become, but what it was or might have been. That the natural propensities, as indicated by the appearance, are often subdued, is a matter of common remark. 'I have seen,' says Addison, 'many an amiable piece of deformity, and have observed a certain cheerfulness in as bad a system of features as was ever clapped together, which has appeared more lovely than all the blooming charms of insolent beauty.'" It is the incongruities of physiognomy that militate against the pretenses of the character-reading theories; fine physical form of features by no means indicates a beautiful soul behind the face, and no more does mere physical deformity mean that the soul is deformed, although we would all prefer that a beautiful soul should look out of a beautiful face. It is too often this desire to associate the two that leads to theorizing upon the assumption that nature associates desirable internal characteristics with attractive features, and disagreeable dispositions with repulsive features; but in reality she does not do this at all, but gets them sadly mixed. In fact, it is impossible to bring character-reading down to a rational basis and to classify expressions into a system. Lavater and his followers tried it and failed. We can only judge of faces by our intuitions and inherited instincts. We can do little more than the child does,—judge by the conscious effect expressions produce upon our feelings. In fact, expression is a thing of the feelings and of the emotions. It is not of the mind, and therefore defies analysis, as do all phenomena of the feelings.

Another phase of expression of the face is the relation it bears to and the part it takes in the religious feelings. Being the ally and messenger of the heart and the emotions, it is but natural that it should partake of the religious emotion when present, and reflect it in its beauty or austerity. Pure religion has a beautifying effect upon the face and spiritualizes it. A highly spiritual life by the devotees of any creed, in which all selfishness and sordid things are excluded and forgotten, and the passions which so distort the features are completely restrained, has this ennobling effect upon the face. This is always noted in the priests and earnest disciples of any creed, whose faces have a peaceful and pure expression which nothing else can give. It argues that the passions and selfish feelings have the most degrading and disturbing influence upon facial expression, and that unselfishness and the contemplation of lofty themes have the most elevating and refining effect.

We may sum up our conclusions briefly as follows :

1. The face is the servant of the emotions and reflects the heart rather than the mind of man.

2. It is the expressional area *par excellence* where the physiognomy of the individual, as revealing his character, is most indicated.

3. Facial expression is, in its last analysis, a sign language, a gesture speech, *i.e.* communication by gestures of the features.

4. Expression is part of the fact of feeling. As Diderot said, "Every gesture is a metaphor," and characterizes the translation of feelings into expressions. Mr. George Romanes says it is the translation of "the logic of feelings into the logic of signs."

5. The physiology of expression is based on three principles, according to Mr. Darwin : (1) the principle of serviceable associated habits ; (2) antithesis ; and (3) the condition of the nervous system.

6. The face symbolizes character in an especial and emphatic manner, and these symbols are easily read so as to be of great value to men in understanding each other.

7. Lavater's fantastic system, and all of those which pretend to read and analyze character by mere association of expressions and faculties, are failures, and necessarily so because of the many incongruities.

8. Faces in art affect us as living faces do, because of the characters which they depict and reveal.

9. The symbolizing duties of the face, or of other parts, do not interfere with their physiological functions, nor *vice versa*, but they abide harmoniously together.

10. Both transient and habitual habits of expression must be distinguished from those which are inborn and reveal the inmost soul.

11. The spiritual life refines and elevates the face by the exclusion of selfishness and the suppression of the passions, and by substituting lofty and ennobling thoughts.

And so, as an old writer has said, "the face is the very representative of our race, the symbol of humanity ; not a part of the body, but the very self: the badge of distinction between and the proof of the identity of men." Or if, as Carus had it, "man is the symbol of the Divine idea of mind," then is the face the symbol *of* the symbol, the expression of the Divine in man !

A SEPARABLE BRIDGE.

BY R. WALTER STARR, D.D.S., PHILADELPHIA, PA.

SOME years ago a young man of perhaps twenty-seven years presented himself exhibiting a calcareous deposit which as a solid mass encased the lower right central and lateral from near their cutting-edges to within less than a quarter of an inch from their root-ends. The gum was highly inflamed and thickened, and pus flowed freely from under the margins of the mass upon its slight movement by the tongue or by a touch of the finger. Removal was deemed necessary, and was found to be a very easy matter ; in fact, the mass would hardly have remained in the mouth but for the extension of the deposit over upon the left central and right cuspid. The appearance of the extracted mass is fairly represented by Fig. 1.

The tumefied margins of the diseased gums were excised and cotton wet with carbolic acid packed into the cavity to serve as a tent, which was allowed to remain from Saturday to Monday. The tent served to have materially lessened the discharge of pus, and furthermore permitted a clear view of the exposed bone and of the fungoid growth which had underlaid the calcareous deposit.

The bone was quite extensively necrosed, and the adjacent tissues so undermined that pus freely exuded. The affected bone was removed with engine burs, and the parts thoroughly syringed with warm phenated water. The tongue, lips, and parts bordering on the cavity were carefully protected by napkins and bibulous paper, while a fifty per cent. solution of commercial sulphuric acid was applied to and kept in contact with the exposed bone during several minutes. The acid was then removed by absorbents, and bicarbonate of soda sprinkled over the surface. Suitable dressings were applied from time to time, and in the course of six weeks the parts were solidly healed. Meantime the left central, which leaned somewhat toward the right cuspid, was properly straightened and trimmed. The very great loss of process and bone is shown in Fig. 2. The impression for the cast from which the illustration has been made was obtained by the following method: A lump of stiff-mixed plaster was held by the fingers against the central and cuspid on their lingual faces, and modeled into a wall between them on a line with the vertical middle of each tooth. When hard, the piece was removed, trimmed, and varnished with shellac. It was then replaced and held in position while a mass of stiff-mixed plaster was pressed against the plaster wall between the teeth and over their labial surfaces. When hard, it also was taken out, trimmed, and varnished. The two pieces were oiled on their outer surfaces, put together in the mouth, and a plaster impression taken over them, as well as of the other teeth, from which the hardened plaster separated as usual, leaving the oiled sections in the mouth to be replaced in the impression and serve as an ordinary matrix for the model shown in Fig. 2.

FIG. 1.

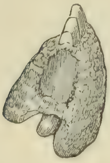


FIG. 2.

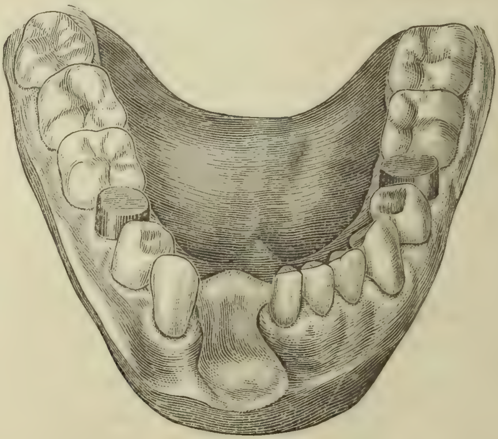


FIG. 3.

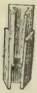


FIG. 4.

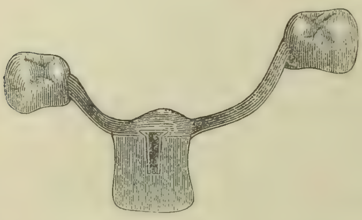
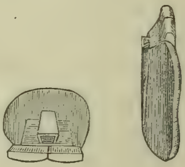
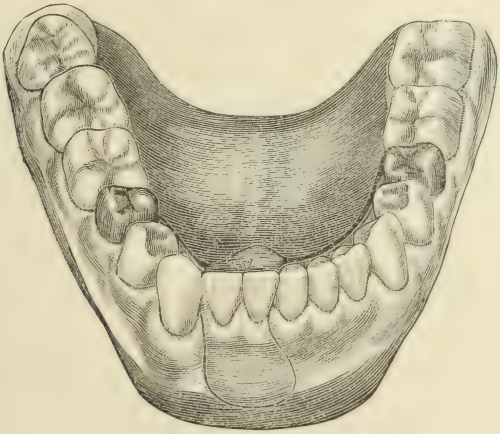


FIG. 5.



The two second bicuspids had been trimmed and fitted with gold caps which remained cemented fast to the living natural teeth, as, for the purpose of illustration, they appear in Fig. 2. Telescoping crowns were fitted over these caps and connected by a thick gold bar. A strip of thin gold plate was bent over three sides of a slightly tapering one-eighth-square piece of steel, and then another strip of plate was bent over the first strip to closely fit it. The sides of these sockets were bent somewhat inward, so that an endwise telescoping dovetailed socket was produced like that shown in Fig. 3. The back of the outer section of the sliding socket was cemented to the bridge-bar, and after investment the backing was built up with pieces of gold plate and solder into the shape shown in Fig. 4. This fixture could be placed in the mouth, and its socketed center allowed to rest solidly on the newly covered bone at the bottom of the gap, which was but about half filled by this socketed part of the bridge.

FIG. 6.



Two single-plate teeth with very long gums were ground, backed with a single piece of gold plate, and properly adjusted and articulated. The complemental part, which fitted in the dovetailed socket, was then secured by wax to the backing of the teeth, two Bessemer steel wire bow-clamps adjusted to hold the socket-piece against the backing, and the teeth invested for soldering. Fig. 5 shows this separable section of the bridge from two points of view, and Fig. 6 exhibits the completed and separable, as well as removable, bridge as it appeared when in place. The tapering socket sufficed to hold the teeth-section fast and firm, yet admitted of easy intentional separation, for cleansing or for the removal of the bridge. This might in other cases be made permanent, and the teeth-section be separable, as in this instance. No subsequent adjustment was found necessary, and since the final inspection, when everything appeared mutually satisfactory, nothing has been heard from the patient.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held its twenty-first anniversary, January 14, 15, and 16, 1890, in the Masonic Temple, Sixth avenue, corner of Twenty-third street.

The meeting was called to order on Tuesday evening, January 14, by the president, Dr. A. L. Northrop, and opened with prayer by the Rev. Brady E. Backus, D.D.

President Northrop made an address of welcome in which he gave a history of the origin of the society as a legalized body, and a summary of the laws enacted to regulate the practice of dentistry in this State from the time of the society's organization until the passage of the law of May 31, 1889, by which unqualified persons are forbidden from practicing, and said, "I have gone into all this detail to show you, gentlemen, what legalized effort and action have done for us in twenty-one years. Its fruits and benefits are shown by our prosperity, and I trust that they will continue to increase in greater ratio during the succeeding twenty-one years. I do not wish to be understood as meaning that this has been accomplished entirely by the First District Dental Society, but would simply say that a committee from this society first started the movement, and I believe has been present to keep it in motion whenever the subject of dental legislation has been suggested.

"As for the scientific work done by this society for the last twenty-one years, you all have read our published proceedings and can judge whether we have done our share of the work or not. I think, with all due modesty, that our record shows that having worked in harmony and assisted the State society in the promulgation of its laws, our society need fear no comparison; having done as much or more than any other body of dentists for the elevation of the profession we so much love. To this twenty-first anniversary we bid you a hearty welcome."

Dr. M. Whilldin Foster, of Baltimore, Md., was called upon to respond to the address of welcome, and congratulated the society upon having had so ably presented the history of its origin and growth, and its influence upon the dental profession. He thought it of advantage at times to take a retrospective view, and to consider the wonderful advancement of the profession.

In behalf of those in attendance from the Eastern, Western, Middle, Southern, and Southwestern States, and also from abroad, he said, "We know we are to be the gainers by this pleasant reunion; that we shall form stronger attachments to those with whom we are brought in contact, and that we shall have before us the most advanced methods and the most advancing men in our profession. We expect to go from here filled with well-digested facts and thoughts. It is at no small sacrifice we have come to be with you, but we know we shall be doubly repaid, and our indebtedness to you can only be returned in the expressions of the warmest congratulations on your advanced work, and of the hope that your usefulness in the future may be increased by your ripened experience. We give you our presence in exchange for the advanced ideas we have a right to expect. We thank you for your very cordial greeting."

Dr. J. N. Crouse, of Chicago, Ill., was then introduced, and delivered an address on the subject of the "Dental Protective Association of the United States," explained its object, and urgently solicited those of the profession who had not availed themselves of its protection to sign the by-laws and pay the initiation fee necessary to secure membership therein.

The President. Gentlemen, I have the pleasure of introducing to you Dr. Eugene S. Talbot, of Chicago, Ill.

Dr. Talbot then read the following paper, entitled—

Fallacies of some of the Old Theories of Irregularities of the Teeth, with some Remarks on Diagnosis and Treatment.

During the past few years new theories regarding the causes of irregularities have been advanced without eliciting much comment or discussion. At the same time men of ability continue to adhere to and advocate the old theories without giving reasons for the faith that is within them. This unsettled state of opinion is my excuse for reviewing them and calling your attention to their weak points. As long as the objections that can be raised against a theory are stronger than the arguments in its favor, there is an excuse for a new theory. Men of science cannot submit to either passively, but must prove all things before rejecting or adopting them.

A High Contracted Vault results from Thumb-sucking.

1. A high vault may be found in connection with thumb-sucking; but this is not the case in many instances, and most individuals that have high vaults have never sucked their thumbs. If a mere coincidence cannot be taken for a cause, no reasonable conclusion can be drawn when this coincidence is limited to a small number of cases.

2. When the thumb is passively inserted into the mouth, no impression is made on the vault itself, though the parts between which it is inserted may be arrested in their development. A pressure necessary to produce a modification of the hard palate could not be borne;

at least the child would find the comfort derived from thumb-sucking insufficient compensation for the distress endured. As soon as the lower teeth strike against the thumb with sufficient force to produce a pressure against the roof of the mouth, the uneasiness prevents the child from persevering in this position.

3. Thumb-sucking is begun very early in life, often as early as the first or second week. If an irregularity of the upper jaw would result, it would naturally appear before the permanent teeth are erupted, but the deciduous teeth are rarely found to be modified.

4. That a high and narrow vault cannot result from thumb-sucking alone, is shown by its extent. The deformity must appear where pressure is applied and confined to this area. That it should extend farther back is not reasonable.

In a recent work on irregularities we find the following statement regarding thumb-sucking: "In each case the jaws are held temporarily apart so that there could be no occlusion of teeth even though they occluded normally when the jaws were closed. This leaves the side teeth free to change their position if any influence is exerted to produce that result. In the act of sucking the cheeks are drawn in, and the strong pressure thus brought to bear upon the bicuspids and (occasionally) the first molars causes them to be bent inward. In this malposition they are frequently confirmed by the opportunity thus given to the other molar teeth to move forward, of which they are not slow to take advantage. The result is the deformity known as the 'saddle-shaped' jaw."

Since the child begins to suck its thumb at birth or soon after, and ceases to do so about the sixth year in a majority of cases, and as irregularities of the temporary teeth are never observed in this region, this theory falls flat.

This summer I examined the mouths of five thumb-suckers at the sea-shore. Two boys, twins, twelve years old, and a girl of nine, belonged to the same family. The boys had sucked their thumbs from birth, discontinuing at seven, probably from shame. The mother informed me that in each case the thumb of the right hand was inserted into the mouth with the palmar surface toward the tongue, producing pressure upon the teeth. These boys were strong and active, their jaws well developed, the vaults of medium height, the dental arches normal. The girl was gradually discontinuing the habit. She had also sucked her thumb from birth and held it in the same way. Another child, a girl of five, showed a slight forward movement of the right temporary central incisor, which could only be noticed on close inspection. The last case was that of a boy four years of age, who was sucking his thumb most of the time. He directed the palmar side of his thumb toward the upper alveolar arch. The pressure thus produced resulted in a slight absorption of the alveolar process, while the contour of the arch and the position of the teeth were perfectly normal. In none of the cases cited were the permanent teeth irregular.

That Irregularities are Produced by a Force originating in the Sphenoid Bone and acting upon the Intermaxillary Bones.

On page 86 of his work, Coles makes the following statement: "The deformity known as the intermaxillary prognathism is the result of a force operating on the intermaxillary bone, such force originating in the body of the sphenoid and being transmitted by the intervening nasal septum."

It is observed in cases of idiocy, etc., that from inflammation of membranes *in utero* bones and sutures ossify early in life; on the other hand, it is observed in some cases that the same bones and sutures do not ossify till the thirty-fifth year. It stands to reason, with such difference in time of ossification there must be a marked difference in the size of the cranium: the more retarded the ossification, the more likely the cranium is to be large. Those pathologists that make a specialty of idiocy regard this premature or tardy ossification as an important means of differentiating different pathological conditions. Such differences must necessarily affect the base of the skull, for in this plane we find the greatest number of sutures. Coles had this in mind when he advanced his theory. The tardy development of the nose, which often does not assume the family type until late in life, corroborates this fact, for the face is in a direct line with the force exerted by the development of the bones at the base of the cranium, with which it develops simultaneously. But these conditions cannot affect the maxillary bones, for they are situated a considerable distance below the plane of the occiput.

If force could be communicated at all, it would have to be exerted nearly at right angles with its line of origin, which would lessen it materially. In this case the force would not only be exerted upon the intermaxillary bones, but also upon the maxillary, palate, turbinated, lachrymal, nasal, and malar bones as well; in other words, all the bones of the face would be acted upon, giving an apish appearance to the face, rather than producing prognathism. The fact that the sphenoid bone articulates with all the bones of the skull at the base of the brain probably led Coles to conclude that it must affect the intermaxillary bones, but the force exerted by the sphenoid bone is not in the line of the hard palate, but a considerable distance above it, diverging from it. The only way in which it would affect the intermaxillary bones is through the medium of the palate-bone and the palate; but the palate-bone is frail and contains a number of sinuses, so that all force would be lessened by these media, and the palate would be more apt to be bent out of shape than to communicate force to the maxillary bone.

2. The superior maxillary bone develops earlier, hence would exert more force on the intermaxillary bones than the sphenoid bone, for it must grow in every direction. Because of this priority of development it would be more apt to modify the sphenoid bone than be modified by it. To show that the maxillary bone is of far more potency in irregularities than the sphenoid is reserved for a discussion which is not the province of this paper.

Irregularities are Inherited and Congenital.

Just as a child may resemble a parent in form and features, so he may have an upper or lower maxilla similar to that of one of his parents, but what is termed an irregularity of two or more teeth in one or both jaws cannot be inherited for the following reasons :

1. The size and form of one maxilla may be inherited from one parent while the teeth do not resemble those of the same parent ; and even if the teeth are apparently of the same size, relation, and character, the denture as a whole shows marked differences when compared with another.

2. The character of two dentures depends largely on the character of occlusion and movement. In order that two upper jaws may be alike, it is not only necessary that the jaws and teeth shall have originally the same characteristics, but that the lower jaws must also be alike and articulate in the same manner and degree with the upper. If there is a difference of degree of development, differences in direction and occlusion must follow.

3. Irregularities often arise from premature or tardy extraction of a tooth. It would be difficult to find two cases in which the above conditions are found, and the same teeth are extracted at the same time and under the same circumstances.

The usual cause of premature extraction being caries, the nutrition of parent and child, their environments, state of health, education, and occupation would have to be the same in order to produce the similarity of conditions that manifests itself in likeness of caries. The mode of life of the present generation differs from that of the past,—a fact easily explained. Climate is undergoing gradual changes; habits change with a difference of food and affluence or poverty ; the occupations of parent and child are not often the same ; permanence of habitation is not the rule ; malaria and fevers are prolific causes of caries, and their prevalence differs with localities and periods of time.

A parent having been reared in a new portion of the country, leading an active life, living on food requiring thorough mastication, exposed to changes of weather, is likely to have a denture different from that of his son, who may have inherited the same form of jaw and similar teeth, but whose environments differ from those to which his father was subjected. Then there are the differences of the nervous system due to peculiarities of education and social conditions. The process of training and the surroundings during this period are rarely if ever the same in both parent and child.

I think I am correct in saying that jaws are growing smaller and caries appears earlier, though the size of the teeth remains the same. It may be objected that although in our generation these varied conditions are not likely to produce the same form of irregularity, in halcyon days of old this was otherwise. To this we reply that never in the history of mankind has there been such simplicity of life as to produce two dentures exactly alike, whether normal or irregular. Diversity of form is the law of organic bodies. It holds good in both the animal and vegetable kingdoms, extending probably even to cells. With all apparent similarity there is a great diversity of detail.

Instead of saying that two cases of irregularity are alike, it would be better if the dental profession would adopt the expression, "Two cases of irregularity are similar." By doing so they would get nearer the truth and make room for individual peculiarities the observation of which is worthy of scientific consideration.

From the foregoing it will be seen that local conditions that cannot be the same in two individuals modify the arrangement of teeth.

Regarding the theory held by some that irregularities are congenital, it is only necessary to call attention to the fact that children are not born with teeth, certainly not with permanent teeth, which of course shuts out irregularities.

The Theory of Mouth-Breathing.

Contracted arches have hitherto been attributed to the pressure of the buccinator muscle on the alveoli in sleeping with the mouth open. This theory seems to be held generally for the reason that some cause of the contracted alveolar arch must be found, and in absence of any other that of pressure of the buccinator seemed plausible. This kind of reasoning does not appeal with much force to the mind, and includes important elements of error. It amounts to this: A contracted arch is found in some cases of sleeping with the mouth open. Pressure is the usual cause of dental irregularity. The contraction appears in the region of the bicuspid. No source of pressure being apparent, it is assumed that the buccinator exerts it. This is simply an opinion of possibility, not probability, much less inductive reasoning. It is based on the erroneous deductions (1) that some cases of mouth-breathing are representatives of all cases, (2) that pressure must necessarily be the cause of all irregularity, (3) that the buccinator muscle exerts the pressure, as no other source of pressure is apparent. The human mind being restive under an acknowledgment of its ignorance, an opinion of possibility is hastily accepted as a theory.

In view of facts that every dentist must acknowledge, this argument cannot stand for the following reasoning :

1. It is inconsistent with our knowledge of the influences exerted by muscular structures in other parts of the body. Some of the muscles of the chest in respiration exert quite as much pressure as the buccinator during sleep, yet no one would expect to find the ribs modified by this process. The function of the buccinator is to keep the food under the molars in mastication. The pressure exerted by it on the crowns of the molars is not sufficient to affect the alveoli through the roots of the teeth ; but even if it could modify these spongy structures, its force would stop there and would not extend to the osseous vault, bending it out of shape. When one opens his mouth, he is conscious of a tension of the orbicularis oris, but not of a pressure of the buccinator. A study of the origin and insertion of this penniform muscle shows that its fibers are inserted along the edges of the jaw and that they extend forward in a plane parallel to these processes. To produce a contraction of the arches by a muscular structure, the fibers would have to run at right angles to these uniting the two halves of the arches.

2. Muscles do not contract to a degree sufficient to produce the necessary pressure. It is true, as is generally asserted, that the tongue and lips are instrumental in changing the position of a tooth or teeth, but the action in these cases differs from that of the buccinator. The action of both tongue and lips is more or less voluntary, and in both cases what influence is exerted is due to repeated muscular *impulses* rather than a long-continued quiet *pressure*, such as that of any layer of muscles upon a portion of the osseous system.

In the former case we have force proper, in the latter simply weight ; the first is active, the second passive. In sleep the voluntary muscles are at rest, except in those semi-conscious states we call dreams. It is therefore out of the question to speak of muscular contractions in connection with a voluntary muscle in sleep. When the mouth is open during sleep, due to some obstruction in the air-passages, it is the result of reflex nervous action, not direct volition.

3. But suppose for a moment that the direction of the fibers of this muscle were such as to permit of a contraction of the vault laterally, we should expect to find the modification of the osseous structure uniform. This would shut out semi-V- and semi-saddle-shaped arches entirely, and a majority of other irregularities of the teeth in which there is bilateral asymmetry, for however much one would incline to the prevalent theory, no one would assert that the muscle will act on one side of the mouth while that on the opposite remains passive.

4. Partial V- and partial saddle-shaped arches make it still less plausible. In these we meet with sudden bends inward, where only one or two teeth may be involved, which could only be produced by a centralization of force on one given point, a peculiarity of function that has never yet been ascribed to muscles.

5. Lastly, if the buccinator acts as all muscles uniformly throughout its extent of contraction, below its median line it is just as efficient in producing a narrow contracted arch as in its upper portion, and we should expect to find the lower maxilla contracted whenever the upper one is, which is contrary to facts.

To recapitulate, the theory that the pressure of the buccinator muscle in sleeping with the mouth open is the cause of contracted arches is incorrect, (1) because it is inconsistent with our knowledge of the influence exerted by muscular structures on the osseous system in other parts of the body ; (2) because muscles do not contract sufficiently to produce the necessary pressure ; (3) because by such pressure exerted on both sides of the arches semi-V- and semi-saddle-shaped, partial V- and partial saddle-shaped arches would be out of the question, and (4) the lower maxilla would be modified as much as the upper.

On Making a Diagnosis of a Case of Irregularity.

Irregularities have been divided into constitutional and local : the former affecting the body of the bone, the latter being accidental, affecting the teeth and alveolar process.

Frequently when a case of irregularity is presented we can tell by the general contour and profile of the face whether the case is one of the constitutional or local type, the external proportions being affected by a decided V-shaped arch, excessively developed alveoli, or underhung jaw. One of the first things a dentist has to learn is to observe carefully. In determining the correctness or incorrectness of the outline of the mouth and jaw, he instinctively takes it in as a whole, on the same principle that when we look at the picture of a friend we decide at once whether it is a good likeness or not, reserving our judgment on particular points until later.

Observe each jaw. See whether it has a normal outline or whether it belongs to the V-shaped or saddle-shaped variety ; this will help you to decide about the appliance to be used.

Now comes an important feature of a correct diagnosis. Examine the occlusion, letting the patient open and close his mouth slowly. No detail must go unnoticed. The beginner should familiarize himself with the individuality of each class of teeth both as to outline and occlusion. For this purpose he is advised to study the very excellent article by Dr. E. T. Starr and F. L. Hise, in the August number of the Dental Cosmos, vol. xxxi.

When there is an asymmetry of the upper and lower jaws, one being larger than the other, the occlusion from the cuspid back is usually wrong. In such cases it generally strikes in front of the lower cuspid instead of between it and the bicuspid, disarranging the articulation of every tooth back of it. We cannot stop here to speak of the different forms of malocclusion; the dentist who never ceases to be a student will see these for himself.

The difficulty in local irregularities is usually easily detected, for it is found either in the alveolar arch or in the malposition of individual teeth.

Before giving your opinion inquire into the family history. Dr. Kingsley justly remarks that it is useless to try to correct an irregularity peculiar to a family type: nature reverts to her original design notwithstanding long-continued efforts. For this reason it is usually well to wait until the patient is of an age when it can be determined what permanent form the jaw will assume.

When the arch is overcrowded and cannot be spread, or when it protrudes and the extraction of one or more teeth appears advisable for the purpose of obtaining space, care should be exercised in deciding upon the right ones. Examine to see which teeth are carious or diseased. Do not extract a first molar if it can be preserved with comfort to the patient. The cuspid is the most important tooth in determining the outline of the wing of the nose and upper lip and giving character to the face; for this reason never remove it when avoidable.

Eighteen years of experience in the correction of irregularities of the teeth and a practical knowledge of the laws of mechanics have taught me not to rely on any particular appliance. Frequently, though a certain appliance has worked well in one case it may not be efficient in another case of a similar nature, and not unfrequently two or three of the different forces are tried before one shows itself effective, this being due to the unknown factor of resistance which can be determined only by experience.

Discussion.

The President. I have the pleasure of announcing that Dr. W. C. Barrett, of Buffalo, will open the discussion of this subject.

Dr. W. C. Barrett. Mr. President and Gentlemen: It would be much more pleasant and agreeable to say to the lecturer, "I heartily approve of all you have said," than to adversely criticise the paper; but we do not elucidate correct methods of practice in that way. When we call in question dogmatic assertions and demand the proof, we are set to thinking, and are apt to obtain better reasons. The paper itself is a mere mass of negations. It asserts nothing, teaches nothing; it simply says this and that is not so. I have obtained a great deal of information from papers which Dr. Talbot has read before us on other occasions, but I am sorry to say that this paper is not so instructive. When a man says a thing is so, and that he can prove and demonstrate it, then we have something positive; but when he simply attempts to tear down theories that have already been accepted, and gives us nothing in their place, that is not instructive.

Irregularity of the teeth is a departure from the normal type. What is the normal type? It has never been established. I do not know that it can be determined at the present day. Those who accept the doctrine of evolution, that from single germs everything that exists has been developed in the course of innumerable ages, which is the accepted belief at the present day among scientists (and it is quite a safe assertion that no man who has studied the subject and is competent to judge dares deny the truth of that doctrine), will, in trying to determine what the type is, necessarily go back to the earliest history of things that are past. To determine that a child's teeth are irregular, it is necessary to go back farther than the immediate progenitors of that child; we must trace the development through the ancestral line until we have determined what was the original condition from which this is an aberration. To absolutely determine the type we must trace all the gradations through the ancestral development until we reach as near to the origin as possible. If I take a particular case and say, Here is an aberration from the normal, here is an irregularity, what do I mean? What is it a departure from? I find that those teeth are not arranged precisely according to my ideas, but I do not know how nature would arrange them, because I do not know what the original and normal type was.

I am able to-night to present this question to you from a new standpoint, in a way that it has never been presented before a dental society within my knowledge; that is, to trace it through the allied species as far as we can. I shall attempt to show the difference in the development of the several classes of animals which are allied to man, especially the quadrumana. I have here a considerable number of skulls of the quadrumana, from the lemurs through the anthropoids, and I shall endeavor briefly to trace the aberration through these allied species. I am under obligation to Professor Ward, of Rochester, for some of these specimens. He has a large collection, and has agents all over the world collecting specimens and preparing the skulls and anatomy of the different animals for his establishment.

If we examine some of the earlier forms, we shall begin to see what the type of the dental arch may be. I hold in my hand a dentition of the collared peccary, an animal somewhat resembling the hog. You may perhaps find here the great archetype of mammalian dentition, from which everything else is a departure. I do not say that it *is* the archetype, but it seems the most perfect dentition with which we are acquainted. The arrangement of the teeth in these jaws is not an arch. It is the half of a parallelogram. There are three molars and three premolars, with six incisors, indicating a dentition of forty teeth. Man has but thirty-two teeth. If human dentition be a departure from that, man has lost two premolars and two incisors. So if this be accepted as the archetype, we must remember that man's whole dentition is an aberration. I do not say that is the case.

I have here also the denture of an animal of the canine tribe—the coyote. Here we have a similar arrangement of the teeth. I do not mean to say, remember, that the teeth are morphologically similar; I am speaking of the general arrangement. We find two premolars and two molars, arranged almost at right angles with the incisors. The incisors are comparatively square across, in a line. There is a drawing in of the arch of the teeth, and of the maxillæ, at about the region of the last premolar. Now, if the general arrangement of the teeth of the lower animals is a straight line at the sides, with the anterior teeth almost in a straight line across the mouth, the teeth forming about the half of a parallelogram, then we can understand something of what is the type of the shape of the jaw, and may be able to discover from that what the aberration is.

I now show the denture of a male gorilla. This animal is allied to man very closely, having the same number and the same forms of teeth, the same morphology and the same arrangement of the teeth. But there is a wonderful difference between the dentition of this animal and the dentition of man. Here we have the molars and the premolars forming almost a straight line; nothing approaching an arch whatever. We find a drawing in of the premolars, so that the line which they form with the cuspids and the true molars is rather concave than convex, with the incisors at a right angle to it.

Here is the skull of a chimpanzee. The arrangement of the teeth is exactly the same. There is a drawing in at the neighborhood of the premolars, and the outside line is again concave instead of convex. That feature is carried out in the dentition of the animals which are nearest to man. So it seems to me, according to the accepted doctrine of evolution, the aberration from the normal type is not what we have supposed it to be heretofore.

I show you another order of the quadrumana, the Semnopithecus. We have here a swelling out of the line of the teeth; instead of being concave it is convex, but only to a slight extent. Here the sixth-year molar is pressed out, while the third molar is drawn in.

I have here skulls of nearly all of the species of the quadrumana, and I can trace that feature all the way through, but I will not weary you by going over them all.

Then the type of the jaw is what? If we accept the doctrine of evolution and trace the arrangement through the ancestral development, we get back to this point: that the arrangement of the teeth, instead of being an arch, is the half of a parallelogram. Take this skull of the gorilla; we have the concavity of the skull posterior to the extremity of the maxillæ. Anyone who has studied comparative anatomy will readily understand that the sphenoid bone here occupies an entirely different position from that in this human skull, where you find the maxillæ absolutely underneath the dome. Compare the two. You see the difference in the development of the maxillæ. Of course, anyone who reflects upon the manner of the articulation of the sphenoid bone will understand that in this case it occupies a larger space in relation to the other bones than ordinarily. Instead of being short in the body, we find it lengthened out. Instead of the articulation with the other bones being at an acute angle, it is obtuse. It produces a very peculiar condition of the maxillary bones through the reduction of the prognathism.

Now, in the drawing back of the maxilla of this, if we assume it is compressed, there will naturally be produced an expansion of the line of the teeth upon the sides, and we find something of that form of arch in this human dentition. It is an approach to a semi-circle. Compare that with the form of the dentition of the gorilla. You will see and comprehend the difference in the shape of the jaw; that those teeth form nearly the half of a circle, while in this it is nearly the half of a parallelogram. It is due to the drawing back of the maxillæ.

Wherever we get an aberration from that which is supposed to be the normal, we find an approach to this (I am speaking of an aberration of the whole dentition), then you have the saddle-shaped jaw; that is, the normal jaw of the lower orders of animals. It is a natural inference that in any aberration from the usual type we get a return to the ancestral development. So, when there is an aberration (and I am not speaking of the disarrangement of a single tooth) it is generally in the direction of what we call a V-shaped or a saddle-shaped arch. It is simply a return to the ancestral development. If this be the case, it seems to me that it places the subject in an entirely new light. It gives us a starting-point from which we can take another departure and study these irregularities from a new stand-point; not taking into consideration the immediate aberration merely, but considering its relation to the original type. Find out what is the great archetype, and then see what the departure is from that. It will not do to look no farther back than the grandfather; we have to reach far enough back to trace the aberration from the ancestry, no matter how far back it is. The law of heredity is a powerful agent, and overrules very many of the other factors ; if we may accept the teachings of the majority of the great naturalists, it may produce in the human species a reversion to a lower type.

There is another point upon which I desire to speak in regard to irregularities. Very many of the aberrations from the normal, accepting this as the normal, are due to the neglect of the dentists themselves. We can trace them directly to our own blind mistakes. The extraction of the deciduous teeth, the early teeth, has very much to do, it seems to me, with the irregularity which may succeed. We know very well that the development of the alveolar process, the alveolus, depends upon the presence or absence of the teeth ; if you extract them you do not have a proper development of the alveolus, and you bring on an aberration. How many cases have I seen in which, the teeth having been extracted, there has been a dropping forward of the first molar, which becomes thereby anchored in an unnatural position. Then, the cuspid being developed, there are two points with not sufficient room between for the teeth that belong there, and the consequence is that they are forced either out or in, and thus an abnormality is produced which is not a general aberration from the established type.

There are a few more points to which I will call your attention. I hold in my hand the skull and the dentition of a lemur. This belongs to the family of the monkeys—to the quadrumana. There are here three molars, three premolars, and six incisors. This is not the dentition of the Simiadæ. It is that of the lower orders of the mammalia, and from this the higher orders—the Troglodytæ, for instance—have lost two premolars, or bicuspids, and two incisors, which gives them the same dentition as man. From the lemur we may trace through the other orders the gradual evolution of the human denture.

Here is the dentition of the macacus, in which there is a departure in the bicuspids and first molars, due to the inordinate development of the cuspid, which has forced them slightly out of place. It has absolutely produced a modification of the first bicuspid, showing what can readily be done.

I have here a coyote's dentition, that shows an aberration from the usual type in the wisdom-tooth.

Here is a cynocephalus. It is not fully developed. There is a marked departure from the normal development in the superior cuspid. On the anterior face of the left lateral incisor there is a case of what Harris denominates "spontaneous abrasion," and which some of our modern wiseacres teach is invariably caused by a too free use of the tooth-brush. I wonder what tooth-powder this monkey used?

I now have in my hand the skull of a troglodyte, a female gorilla. It is asserted, as you know, that caries in the teeth is attributable to improper habits of life, and the artificial preparation of our food. In this gorilla there are on the approximate surfaces of the central incisors most indubitable cavities of decay. There is more than that. The anterior root of the first superior molar—the sixth-year molar—is entirely denuded, and these two lower incisors are quite badly decayed, and alveolar abscess had supervened. Opposite the root of the right inferior first molar are the marks of an extensive alveolar abscess. Also on the inner side of the right inferior molar is a large territory which has been denuded, and a pocket which has been formed by *indubitable pyorrhea alveolaris.*

A voice. Is that a wild or a domesticated animal?

Dr. Barrett. It was a wild animal. It is a specimen that was sent me by Professor Ward. He gave me general information in regard to the specimen, but I have no positive data. But the gorilla has never yet been kept in captivity for any length of time. This simply proves that dental diseases are not due to man's habits of life. We find the same diseases existing in the lower animals.

Here is the skull of an old male gorilla, containing two dead lower incisors, devitalized doubtless by violence during the life of the animal. They are worn to a considerable extent.

The principal point that I desire to make is this : that an aberration from what we have supposed to be the normal of the human dentition is in most cases a return to the animal type ; it is a return to the same contracted form of the arch, at about its center, which is seen in the original type. It is normal in that case ; it has become abnormal in man.

Then it seems to me that in the study of these aberrations and irregularities we should look at the subject from the point of comparative anatomy. Instead of that we have gone to work empirically, the most of us, and not from a scientific stand-point. We have not compared the dentitions of other animals with our own ; we have simply set up an artificial type and accepted it as the archetype, and all variations from that we have called irregularities, when, in fact, it may be that they are simply an indication of a return to that which originally existed. So I say that it is our duty to begin the study of this subject from another stand-point, and examine the dentitions of other animals of allied species in connection with that of man, and see where the change may have been initiated, and what was the commencement of it. How many dentists, how many schools, how many societies have specimens of the dentitions of the different classes of animals? And how many opportunities are there for original study? How many dentists know the difference between the dentitions of the

Graminivora, the Carnivora, and the Omnivora? How many can tell you what is the dentition of the rodents, or of the ruminants, and how they differ from other classes of animals? We simply pat each other on the back and flatter ourselves that we are making wonderful advances in our profession, when the fact is we have scarcely commenced the A, B, C's.

Every society and every office should become a school of comparative dental anatomy; every dental school should offer to its students facilities for examining the dentitions of the various orders of animals, and of their different classes and species. I think it is time for us to awake to the importance of this subject, and to begin the study from a real scientific stand-point.

The President. Gentlemen, Dr. Guilford, of Philadelphia, will now address you upon this subject.

Dr. S. H. Guilford. Mr. President, when a person is called upon to discuss a paper that has been presented, the most pleasant thing would be to indorse what the essayist has said; but when it becomes necessary to combat the views advanced in it, it is not so pleasant. At the same time, if one wants to be true to his convictions he must say that which he believes and not that which he does not believe.

I was interested in the paper read by Dr. Talbot this evening in very many ways; but, to be candid with him, I must say that I have been disappointed. He tells us in the beginning of his paper why he wrote it. He says that new theories have of late been advanced in regard to some of the causes of irregularity, and that they have excited very little comment, or been taken very little notice of,—this he considers unfortunate. The writer of the paper, it is inferred, seeing that the theories advanced by him had not been favorably received, was induced to bring out in this connection some of the old theories, to combat them and show wherein they were wrong. I was disappointed in the paper, because it seemed to me that the essayist failed to prove his points. In combating the old theories he selected for attack many which have never received much encouragement or indorsement, and those which have received acknowledgment in the profession he did not successfully combat or demolish.

He speaks first about the high and contracted vault as a result of thumb-sucking, and mentions that as one of the old theories. I do not know of anybody who believes that. I do not. I have not found in the course of my reading anybody who spoke of it in that connection at all. Therefore it seems to me it was not a good case to select. He says a high vault is sometimes found in connection with thumb-sucking, but more frequently it is found without thumb-sucking. I exactly agree with him. I do not believe a high arch is the result of thumb-sucking. I have never seen a case of that kind. I should suppose it would be the reverse. In the second paragraph he says, "When the thumb is passively inserted in the mouth, no impression is made on the vault itself." He also says, "A pressure necessary to produce a modification of the hard palate could not be borne." I scarcely know what to make of this. I do not suppose anybody believes that a child would put its thumb into its mouth and bite hard enough to make an impression on the hard palate. The impression that is made upon the hard palate is produced by the frequent repetition of the act of thumb-sucking. The thumb is placed there and held many hours, and the effect is produced slowly and gradually, as a hole is made in a stone by the constant dropping of water. That is the way the impression is made upon the hard palate, if it is made at all, by thumb-sucking.

In the third paragraph he says, "Thumb-sucking is begun very early in life, often as early as the first or second week ; and if an irregularity of the upper jaw would result from thumb-sucking it would necessarily appear before the permanent teeth are erupted ; but the deciduous teeth are rarely found to be modified." One would suppose that thumb-sucking would produce an impression upon the deciduous teeth, but observation has shown that such is not the case. As a rule, the arch in early life is not perceptibly affected by thumb-sucking, but we do know that arches are modified and the teeth are placed in irregular positions when the habit is continued after the permanent teeth are erupted.

He says, "That a high, narrow vault cannot result from thumb-sucking alone is shown by its extent. The deformity must appear where pressure is applied, and be confined to this area." Then on another page he says, "Pressure necessary to produce a modification of the hard palate could not be borne." In one place he says the pressure could not be borne, and in another place he says the impression must appear where the pressure is applied.

He quotes the following from a recent work on irregularities : "In each case the jaws are held temporarily apart so that there could be no occlusion of teeth even though they occluded normally when the jaws were closed. This leaves the side teeth free to change their position if any influence is exerted to produce that result. In the act of sucking the cheeks are drawn in, and the strong pressure thus brought to bear upon the bicuspids and (occasionally) the first molars causes them to be bent inward. In this malposition they are frequently confirmed by the opportunity thus given to the other molar teeth to move forward, of which they are not slow to take advantage. The result is the deformity known as the 'saddle-shaped' jaw." The saddle-shaped jaw is not associated with the high V-shaped vault ; it is generally a narrowing only in the region of the bicuspids. It does not make the vault higher, or peaked, or sharp, according to my observation. The passage that he quotes was not written in connection with a high vault: it was in connection with a saddle-shaped jaw. When a man writes something about a saddle-shaped jaw, he does not want to see it quoted as having reference to a high vault. This quotation is certainly out of place in this connection.

Farther on he says, "As the child begins to suck its thumb at birth or soon after, and ceases to do so about the sixth year in a majority of cases, and as irregularities of the temporary teeth are never observed in this region, this theory falls flat." Now, in the quotation above the writer speaks of the bicuspids and first molars. The bicuspids and first molars belong to the second and permanent set; and yet the essayist (Dr. Talbot) is discussing a question, as he says, relating to the earlier years of life, before the permanent teeth appear. He falls into the error of stating that in sucking its thumb the child confines itself to the early years of life. That is partially true and partially untrue. In many cases thumb-sucking does cease at six or seven years of age, yet in many other cases it is continued after that age. When the author quoted wrote what he did in connection with thumb-sucking, he referred to the period after the second set of teeth appear, otherwise he would not have mentioned the bicuspids and molars. Anyone reading this paragraph, which is taken from a recent work, would infer that the author believed that thumb-sucking was carried on to a later period, and after the eruption of the second set of teeth; and it also says that the ill results of thumb-sucking are seldom seen in the deciduous set. Therefore this author is incorrectly quoted, because the context is not given. He says the habit of thumb-sucking continues in many cases later. I have had many cases where it continued to the age of thirteen or fourteen years, and it was only in these cases that ill results were noticed.

Another thing in the paper was a surprise to me. He speaks of having examined the mouths of a number of children during the past summer at the sea-shore. He mentions the case of two boys, twins, twelve years old, and a girl of nine, belonging to the same family, and says the boys sucked their thumbs from birth, discontinuing at seven years, and another child, a girl of five, was a thumb-sucker; also a boy of four years of age who was sucking his thumb; and the doctor tells us that in none of these cases were the teeth irregular. How could they be when they were not affected by the thumb-sucking? The habit was discontinued before the permanent teeth were erupted. So instead of the above theory falling flat, it seems to me that it is his criticism that falls flat.

In the second part of the paper he speaks of a statement made by Mr. Oakley Coles, of England, attributing the protrusion of the superior jaw to the influence of the sphenoid bone. I have read a great many works on irregularity, and none of those that I have read contain this theory. It is not generally accepted ; and I think that in the selection of it to combat the essayist chose a very weak one.

In regard to the theory of irregularity being caused by mouth-breathing, the essayist says, "Contracted arches have hitherto been attributed to the pressure of the buccinator muscle upon the alveoli in sleeping with the mouth open." I would like to know who has advocated that. I know of no author who speaks of the influence of the buccinator muscle upon the teeth. Probably he was thinking of something else, because Mr. Tomes, in writing upon the subject of the V-shaped jaw, speaks of the contraction caused by the tension of the orbicularis oris when the mouth is open. If the gentleman referred to Dr. Kingsley, he will find that Dr. Kingsley does not say any such thing in his work on irregularities. He mentions the fact that Tomes speaks of this irregularity being attributed to the influence of the orbicularis oris muscle. Farther on he speaks of the influence of the cheek ; but when anyone speaks of that he does not refer to the buccinator muscle, but only to that motion of the cheeks which is caused by the exhaustion of the air in the mouth by sucking the thumb. Dr. Talbot says, "When one opens the mouth he is conscious of a tension of the orbicularis oris, but not of a pressure of the buccinator." That is exactly what Tomes says. He says the pressure is not due to the buccinator muscle, but to the orbicularis oris. Dr. Kingsley is quoted as teaching that it is useless to try to correct an irregularity peculiar to a family type. Dr. Kingsley is here and can speak for himself; but I have read his work, and I think I am correct in asserting that he does not say that at all. He speaks of the condition after the irregularity has been corrected, and the difficulty of retaining the teeth in place, and says they frequently have to be held in place for a couple of years, while in ordinary cases the patient can be dismissed in six months, showing the tendency of the teeth in these peculiar cases to return to their former positions.

Now, this matter of irregularity is a question that concerns every practitioner of dentistry. We meet with certain cases of irregularity and try to find out the causes that are responsible for them. We cannot take a child and say there is likely to be such or such a form of irregularity ; but when we see a case of irregularity develop, we try to ascertain the cause that produces it. By this method it has been that all the theories in regard to the causes of certain kinds of irregularity have been formed from time to time. There is very little that we really know about it, and very much that we do not know. I believe there is less known of the causes producing the V-shaped maxilla than any other form of irregularity with which we have to deal.

We can scarcely find sufficient evidence to account for the peculiar formation. The field for study is a large one, and all we can do is to observe and investigate and at some future time, when sufficient data have been obtained, form a conclusion as to the cause.

The President. There has been an allusion to Dr. Kingsley's book. Dr. Kingsley is here, and we will call upon him to answer for himself.

Dr. N. W. Kingsley. Mr. President and Gentlemen: It seems to me there is very little left for me to say. If I had anything to combat in the paper, it has been pretty thoroughly combated by the speakers who have preceded me; and if I had anything to defend, I think I have been pretty well defended. When the paper came into my hands, Dr. Talbot having been kind enough to have it printed and distributed to those who were interested and who were likely to be called upon to discuss it, I looked it over, and my first thought was that it was hardly worth the writing. The theories which he disputes are not generally believed, and he has dignified them entirely too much by noticing them. I never saw a so-called saddle-shaped arch which I believed was caused by thumb-sucking. I have seen many cases of thumb-sucking, and some cases of sucking that were not thumb-sucking, but the effect was the same, which was to broaden the arch in front.

Many years ago a lady came to me with her daughter, a girl fifteen years of age, whose upper teeth projected far beyond the lower ones. Having placed her in the chair and looked at the mouth, I said, thinking aloud rather than addressing the lady, "What in the world could have caused this condition!" The mother, with a shamed face, answered, "I suppose it was because I nursed her until she was eight years old." The writer of the paper comments on "irregularities inherited and congenital." No one maintains that irregularities are congenital. I have never seen a child born with more than one or two teeth, and those teeth were regular. So that congenital irregularities are, I think, very rare; and I would not take up time to dispute with the essayist on that point. But that irregularities of the teeth are inherited, in the sense of a tendency to irregularity, is true. The same laws of heredity which transmit racial and family types govern the development of the teeth, and a peculiarity in the parent will be likely to appear in the child, and such peculiarities when transmitted are frequently aggravated or exaggerated. I have observed instances of irregular teeth in children the origin of which could be traced to the parents, and sometimes to the grandparents. Such tendency is transmitted, and the type appears when the time comes for development in the same way we inherit the shape of our noses and the color of our hair, or any other feature. To say that such peculiarities are not transmitted or inherited is to deny something that every one knows to be true.

At the close of the paper allusion is made to myself, and Dr. Guilford kindly refers to the matter by saying I did not say what is attributed to me. Both these gentlemen are right and both wrong. I did say something of the kind. What I said, and still maintain, is this : I care not how much irregularity there may be in any single tooth, or in two or three teeth, and I care not from how far back it may be inherited ; I can regulate that with a reasonable expectation of its remaining so. Whether the regulating will prevent the tendency to transmit the irregularity to children or not I do not know ; I never followed it up ; it would take generations to prove it ; but that it can be corrected in the individual case there is no question. But when I see a very large and prominent upper jaw which belongs to a family type, and it seems desirable to reduce that jaw, there is not much use in attempting it with the expectation that it will remain. We may be able to reduce it by taking out the first bicuspids on each side and carrying the incisors back, and we may hold them by appliances for two, three, or five years, but I will wager that in ten years from the time we take off the appliance the upper jaw will have substantially, if not identically, the same expression that it would have had if we had never attempted to change it. This is what I mean by saying it is useless to interfere with a fixed family type. This argument would not apply to the lower jaw. There are many cases where the lower jaw is retreating and underhung, which are of an inherited character, a family type ; and if we take a child in hand early enough, having that peculiarity, it can be corrected and it will stay corrected.

I was somewhat amused with the first speaker (Dr. Barrett), who out-Darwined Darwin himself. We all of us believe, I suppose, in the theory of evolution, all of us who have given any attention to the subject, but when the speaker was endeavoring to impress upon us his ideas in regard to the "normal type" of the human jaw and went back to the hog for his starting point, I said to myself, *that* is one of the most remarkable proofs of the doctrine of evolution that I have ever known, for, looking at the gentleman as he stood on the platform, no one can say that *he* resembles a hog. It is unusual to find a man who acknowledges that the normal type of his jaws is found in the hog. Most evolutionists are satisfied when they have reached the ape. It is very remarkable, and shows what the law of evolution can do. I should say that the jaw of the hop-toad is more like the normal jaw of a man than a hog's is, and I would rather inherit mine from a hop-toad than from a hog. I hardly think it is worth while to go back so far in order to form a conception of the normal type of the jaws of the human race, nor profitable to institute such comparisons. The normal type is that type which comes to be nearest to the universal and the symmetrical, as exhibited by the people of the time. What is the normal type of the relation of one feature of the body to another? for example, the length of the leg from the knee to the heel, or the relation of the chin to the top of the head? Painters and sculptors have for the last three thousand years studied the human figure with a great deal of care, have attempted to define the normal type, and have made rules for it. The rules that were accepted by the Greeks three thousand years ago are not accepted to-day. The normal type, as defined by French artists to-day, who are the best modern sculptors, is quite different from the Greek type. The normal type of one race of human beings differs from that of another race, and the type is changing with civilization. In determining what to do in a case for regulating, we all have had experience enough to know what is the normal type in that particular case. We do not have to go back to the lower animals, or get a hog and open his mouth and study it in order to find out what we shall do. I think if we study the normal type as we find it, and not the type of the hog, we will come nearer to it.

Adjourned till half-past two o'clock to-morrow, January 15.

SECOND SESSION—*Wednesday afternoon, January 15.*

President Northrop. The discussion of Dr. Talbot's paper will now be continued by Dr. Atkinson.

Dr. W. H. Atkinson. Thumb-sucking may be present with, but not causative of, a high vault. The effect of thumb-pressure is apparent, and undoubtedly conduces to varying irregularities of individual teeth. The usual regular position of the temporary teeth is not necessarily indicative of a regular conformation of the upper jaw; the transitory condition in which these teeth remain, their slight method of attachment, and their persistent deciduous character permit a variable adaptability to possible irregular conformation of the upper jaw unreasonable to expect from the character of the structure and attachment of the *permanent* teeth. Regularity of temporary teeth is, therefore, not necessarily an indication of regular bone position or conformation.

The buccinators *do* exert considerable pressure not only on the cuspids, bicuspids, first and second molars, but also on the superior maxilla in that region, as may be demonstrated by sucking the cheeks in between the teeth strongly. The more ready movement of the bicuspids accelerates their inward motion, and the molars readily travel forward and, as asserted (but denied by the essayist), confirm the deformity.

The condition of consolidation of the maxillary bones and the lack of solidity of the sutures points directly to the possibility of this bone yielding to even slight pressure long continued. Irregularity of the temporary teeth need not follow, as, aside from their small number as compared to the room provided for them, what has been before suggested, their minor solidity of root-formation and of their attachment readily permits an adaptation of these teeth to bone irregularities and an apparent regularity dependent on the occlusion.

The cases cited do not *prove* either side of the question, as normal structures tend to normal arrangement from sheer force of habit. The responsibility referred to the sphenoid bone may be dismissed as an ill-considered attempt to assign a cause for superior maxillary aberration to a bone lacking the structure, position, and relations to produce such results.

Irregularity of one or more teeth is inherited as surely as other family characteristics and resemblances. The absence of certain teeth (chiefly laterals), singly and in pairs, from generation to generation, is presented as one incontestable proof of this. *Identity* is not the rule of human organization, yet similar conformation of tissue induces conditions and relations of parts easily and directly traceable from the offspring to the parent or parents.

Local conditions (always of importance) inducing a departure from type of two dentures do not vitiate the fact of the position of a bone or other tissue being inherited and a direct antecedent of irregularity, although often modifying its exact character. Violent interference of a mechanical nature lies quite outside of constitutional consideration, although it is quite possible that so great an impression may be made on the organism by such interference as to induce a tendency to a similar condition in a child, and this especially during pregnancy.

The argument of similarity of inducing cause in caries, nutrition, environment, etc., as being necessary to establishment of hereditary irregularity, is beside the question, as it deals with specific local conditions, external to the organism, which deliberately remove this argument as bearing on heredity, admirable, broad, and true as it is in its proper application.

The difference between parent and child in their respective conditions of life is more of *structure* of the teeth themselves than of their position and relation in the mouth ; nevertheless a modification of condition *may* result from different circumstances of life, but the general tendency of heredity is traceable in every instance.

As to jaws growing smaller and caries appearing earlier, the latter is certainly an unproved assertion, and my observation neither agrees nor disagrees with the former statement, although as a broad fact I believe it to be true, and it is in accord with the diminution in general size of the race, one reason which has been assigned for this being the consanguineous marriages urged by the desire to concentrate property.

The use of the word similar is of such self-evident propriety as to meet unquestioned approval. Local conditions of two mouths being absolutely non-identical is axiomatic ; still, local conditions are *not* the *only* influences operating on tooth-arrangement. The irregularity of teeth being *not* solely dependent upon the immediate local relation that they hold to each other and to the jaws, the fact that children are rarely born with (erupted) teeth, and "certainly not with permanent teeth," does not shut out irregularities as congenital. The softness of the bones and the plasticity of their sutures in infancy and early childhood is sufficient opportunity for arch modification through inherited discord between muscles, bones, and cavities. The position of the infant, in its reclining posture chiefly, but in all of its situations, is an opportunity for malposition of the bones of the head, and reasonable to effect distortion of the jaws, but *such* would be adventitious and not congenital.

The simile of the ribs is a weak argument as a parallel to the action of the buccinators. The ribs are attached with a cartilaginous connection to the sternum, especially adapted to allow them elasticity in the act of breathing. When I open my mouth, I notice a distinct pressure on the bicuspids and molars above and below, as *well* as the constriction of the orbicularis oris.

If *intermittent* muscular impulses can produce irregularity, how much more will *continued* pressure, of even much less degree, influence a similar condition? *I* dare assert that a deficient hardness of bone *may* be present on one side rendering resistance unequal, which may be aggravated by an unequal strength or activity of the opposite side, and asymmetry of the irregularity of the two sides made possible. [Noses diverted to one or other side of the median line present a common example of asymmetry exemplifying this condition aggravated.]

The buccinators do not remain passive except in sleep. They are in sensible contact with the teeth, and the mouth must be distended with the breath to remove this pressure.

The centralization of force that induces irregularity of isolated teeth distinct from the general character of the denture *is* a *local* antecedent, pure and simple, and apparent on examination. The buccinator acts in producing irregularity as a lever with two fulcra,—possible only with an elastic lever. The superior insertion being farther away from the point of action than the inferior insertion is, gives one reason for its greater effect above than below. Another reason is the form of the lower jaw ; being an open, single-membered arch, its elasticity of form resists permanent displacement.

Local irregularities are not solely due to accidental affections of the teeth and processes, but *local* conditions affect the position and relations of the bones themselves.

The statement was made that congenital irregularities are necessarily shut out. If congenital means inherited, what harmonizes this statement with the reference to "family types of irregularities reverting to original design after attempted correction?" It is seldom that treatment for irregularity should be commenced before the fifteenth year or deferred after the eighteenth year. Though type is accented and perfected by increasing age, all needful conditions are present by the eighteenth year, and our intelligence should be sufficient to recognize the character of the case and to prescribe the necessary correction.

When extraction is resorted to, extract four or *none*, unless previous loss of one or more members of the proper quartet has been sustained. In cases where the loss of less than four teeth of the same type would seem to be indicated, other means can be found to correct the irregularity.

The love and labor devoted to this question by the essayist for many years calls forth my admiration, and I thank him heartily for this presentment of his position on irregularity; and, although feeling constrained to draw different conclusions in considering the subject, I feel that language is more at fault than understanding. Words but poorly express mental action, and contradiction of oneself is easy. Dr. Talbot's efforts are of those that *force* growth upon us. We must be better equipped by his presentment of this subject. Let his earnestness enthuse us to work in other directions as well as in this. The courage to speak out is a grand possession. He has had it, and I honor him for it, notwithstanding the crippling ambiguity of language and looseness of statement of doctrine dominating the paper, making it next to impossible to eliminate irrelevancy and conserve perspicacity short of effort equivalent to rewriting the whole paper or producing it *de novo.* That we may lay an anchor to the windward it is well to recall the caveat of Paul recorded in Romans xiv. 22: "Happy is he that condemneth not himself in that thing which he alloweth."

To apprehend fallacies, verities must be comprehended as the standard expression of truth. In like manner irregularity can only be detected by comparison with regularity of form and function. The tripod of respiration, innervation, and circulation lies at the base of all change of form, position, or action (function) occurring in mineral, vegetable, and animal bodies entering into the food-supply for human beings, the chaotifying of which into peptones gives us pabulum upon which the tissues feed. Perfect peptones are appropriated in entirety without *débris* or loss other than when the supply is in excess of the molecular demand.

To understand hereditary endowment it becomes necessary to comprehend that the elements of organization are traceable to the sources of nutrition of the secerning systems from which the semens are derived. Systems fed to repletion store up excerpts of form and function in bodies known as egg and sperm, the ripeness of which marks the type and limit of heredity. Pure breeding is much like crossbreeding, *i.e.* the product is a compromise between progenitors of the characteristics belonging to each, and hence should be exact balancing of form and function of the parent bodies in the offspring.

Where diverse genuses are bred together, the product is mule throughout the entirety of its body, from the admixture of the ripened semens (egg and sperm) of the parent bodies to completion of bodily and functional characters and longevity of the progeny. The durability of any structure is commensurate to that of the elements of which it is composed. Predominance of plastic elements tends to length of life-line, while that of rigidity tends to shortness of functional swing and, therefore, brevity of career.

In the case of hybridity between the horse and ass, the diversity of length of life-line affords fine opportunity for study of hereditary endowment in the limitation in the horse of say thirty years and that of the ass say one hundred years, exact balance of which would give a line running out at sixty-five years for the exactly balanced mule. But predominance of potency in copulative conjunction will largely minify or magnify the expectancy of life career. This has been so well observed in countries where mules are much used that it is said the mule over the horse limit of thirty years commands a higher price after than before that age, in the expectancy of his now having lived out the limit of equus and entered into that of asinus, he has the expectancy of life of the ass, whatever that may prove to be.

These examples of mass nutrient and functional change would seem to indicate predominant and subdominant degrees of storing of the potency of past molecular changes in the progenitors of *mules*, whereby a large range of hereditary endowment is established in mineral, vegetable, animal, and human modes of function as a sure basis of physiological and pathological presentment of functional power.

Dr. S. C. G. Watkins, Montclair, N. J. Mr. President and Gentlemen : I will say a few words in regard to thumb-sucking and mouth-breathing. Dr. Talbot stated that a high vault was sometimes found in connection with thumb-sucking. That is true ; but, as Dr. Guilford said last evening, it is rare. It is only occasionally that we find a high vault in connection with thumb-sucking. Thumb-sucking causes the incisors to project, and immediately back of them the vault is flattened rather than heightened.

Dr. Talbot also says, "As soon as the lower teeth strike against the thumb with sufficient force to produce a pressure against the roof of the mouth, the uneasiness prevents the child from persevering in this position.'' I think it requires but very little thought to understand that the child does not bite the thumb in thumb-sucking. He simply brings the teeth in contact with the thumb and sucks; and it is the atmospheric pressure brought to bear that causes the jaw to move forward and the teeth to project. I have a few models here which I wish to present in connection with this subject. I have here a family of thumb-suckers. Dr. Talbot said in his paper that irregularities are rarely caused in the temporary teeth by thumb-sucking. These four cases, Figs. 1, 2, 3, and 4, are in one family. The youngest child is a girl of seven years, with all the temporary teeth still in place. She continues to suck her thumb to this day. When she was an infant she had a good occlusion; in fact, in all these cases the occlusion was all right. The upper teeth projected just outside of the lower ones when they came into position.

In the block in which I live there is a child of three years of age; when his teeth came in they occluded properly; to-day the upper teeth are nearly a quarter of an inch outside of the lower ones. I was anxious to secure a model of this mouth, but was not successful. This model (Fig. 1) is not quite correct; the irregularity is worse than it there appears.

FIG. 1.

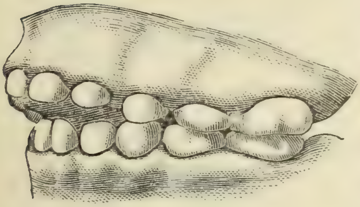
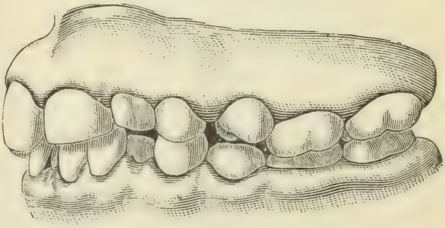
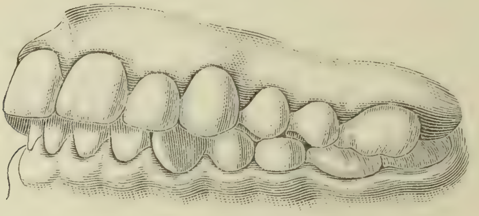


FIG. 2.



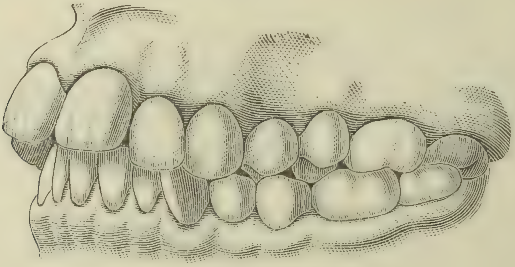
The next (Fig. 2) is the case of a boy nine years of age, who sucked his thumb until he was four years of age. You can see there is considerable projection of the incisors. The next case (Fig. 3) is that of a girl fourteen years of age, with considerable projection of the upper jaw and a shortening of the lower jaw. She sucked her thumb until she was four years old. The next case (Fig. 4) is that of a girl sixteen years of age, with a great projection of the upper incisors and shortening and flattening of the lower maxilla. She sucked her thumb until she was six years old. In each of these cases it will be noticed that there is no high vault, but there is a decided change of shape caused by thumb-sucking. In regard to mouth-breathing, the doctor states that some of the muscles of the chest in respiration exert quite as much pressure as the buccinator during sleep, yet no one would expect to find the ribs modified by this process if the muscles of the face are to be expected to change the shape of the maxillæ and the alveoli in breathing with the mouth open. Now it is perfectly natural for us to breathe, to expand the chest and cause tension of the muscles of the chest in breathing ; but it is unnatural for us to breathe with our mouths open.

FIG. 3.



When we breathe through the mouth we bring a tension upon the orbicularis oris and on the buccinator muscle, the pressure thus brought upon the cuspids especially causing them to press upon the lateral incisors and the first bicuspids, resulting in a contraction of the arch.

FIG. 4.



The doctor also states that where a tension is brought upon the upper jaw sufficient to cause its contraction, it should also cause some contraction in the lower jaw. He says, "If the buccinator acts as all muscles, uniformly throughout its extent of contraction, below its median line it is just as efficient in producing a narrow, contracted arch as in its upper portion, and we should expect to find the lower maxilla contracted whenever the upper one is, which is contrary to the facts." My observation is that instead of contracting the lower jaw the

FIG. 5.

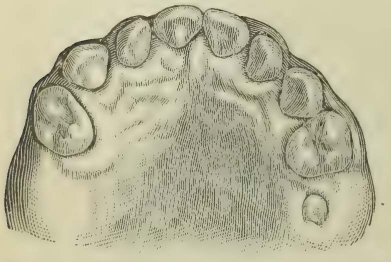
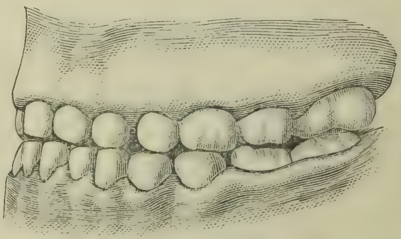


FIG. 6.



pressure brought upon the front of the lower jaw flattens it. Instead of contracting it, just the reverse is found in all cases: the lower jaw is flattened in front and broadened at the sides. As to the orbicularis oris pressing upon the incisors: I have here three models of the mouth of a boy who is now ten years old. This case I know from birth. The model for Fig. 5 was taken when the child was two years of age. You will see there is a nice round arch. The next one (Fig. 6) was taken at seven years of age. In the mean time the child had received a blow upon the nose which broke it, and in healing the cartilage closed one nostril. The child found it easier to breathe through the mouth than through one nostril, and the result was a habit of breathing in that way, a habit which became worse and worse, the child holding its mouth open most of the time both day and night. You will notice there is a decided contraction of the upper jaw (Fig. 7), and a flattening in front and a broadening of the back part of the lower jaw (Fig. 8), at seven years of age. At ten years of age there is a still worse condition of things,—the pressure of the orbicularis oris upon the cuspids, which in turn pressed upon the laterals and bicuspids and forced them inward (Fig. 9).

FIG. 7.

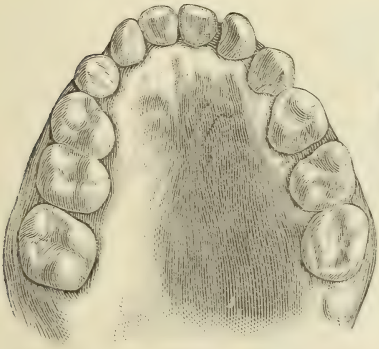


FIG. 8.

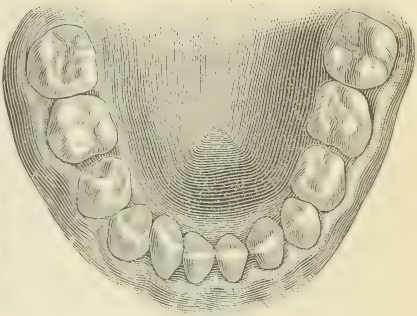
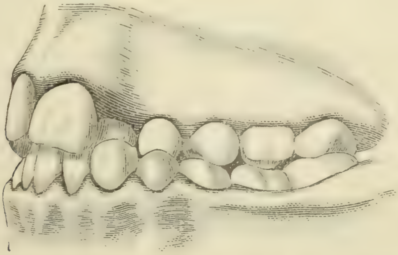
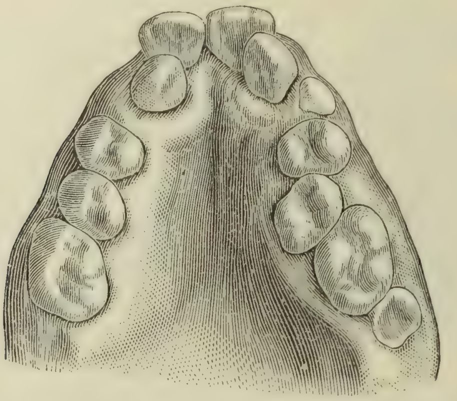


FIG. 9.



The next case (Fig. 10) is that of a child who had St. Vitus's dance. She was in that nervous condition from the time she was five until she was about nine years of age, going around with her mouth open and the saliva trickling out of it. At the time she was taken sick with this disease the arch was round and normal. When she recovered, the upper jaw was contracted and the teeth lapping one another, and the lower jaw flattened in front and broadened back of the front teeth, to such an extent that only the molars touched. There was nearly half an inch space between the cutting-edges of the upper and lower incisors when the mouth was closed. That condition of things still exists.

FIG. 10.



In mouth-breathing the pressure seems to be brought particularly upon the cuspids; there seems to be more strain and pressure there than anywhere else, and the cuspids press on the first bicuspids and the laterals, resulting in contraction. These models show the result of the habit.

B. C. NASH, D.D.S., *Secretary.*

(To be continued.)

REPORT OF THE CLINICS.

(Given at the New York Dental College, corner of Twenty-third street and Second avenue, from 9 A.M. to 1 P.M., January 15 and 16, 1890, under the direction of Dr. H. J. McKellops, of St. Louis, and Dr. V. H. Jackson, of New York, Chairman of the Clinic Committee.)

Dr. A. W. Harlan, Chicago, Ill., demonstrated the action of coagulants and non-coagulants on egg albumen. These experiments were undertaken to show, first, the coagulating properties of carbolic acid, creasote, resorcin, alcohol, peroxide of hydrogen, chloride of zinc, 1 to 1000 solution bichloride of mercury, guaiacol, aromatic sulphuric acid, and synthetic carbolic acid; also to demonstrate the non-coagulating properties of the following-named drugs: oil of cassia, oil of gaultheria, oil of camphor, oil of cajuput, tereben, myrtol, eugenol, oil of cloves, eucalyptol, ethereal solution of iodoform, terpinol, oil of sassafras, and a few others. Dr. Harlan stated that non-coagulants were the ideal medicaments to be used for disinfecting pulpless teeth, on account of their non-coagulating properties. When introduced into the root-canal they would not cook a serous exudate, or pus flowing from a blind abscess into the canal, whereby the delicate canals would be filled with cooked albumen, clogging them and preventing the introduction of fine instruments. When a coagulant is used under such circumstances, albuminous matters, filling the root or draining through the root, are inevitably cooked at once, thereby rendering the removal of the coagulated albumen from the delicate canals a matter of impossibility. This was very satisfactorily demonstrated by experiments made before the spectators, and in every case where non-coagulants were used it was shown that they remained in contact with the albumen product without any coagulating effect.

Dr. G. L. Curtis, Philadelphia, Pa., operated in two cases. The first was a fracture of the inferior maxilla, due to a blow on the side of the face. The jaw was fractured at the symphysis and at the ramus, immediately posterior to the wisdom-tooth. There was but a slight displacement. By gentle pressure the lower teeth were brought into direct articulation with the upper. A submaxillary splint of modelling composition was made and adjusted so as to keep the jaw in position and the teeth under even pressure. Bandages were used to give the teeth perfect articulation. The Barton bandage was applied and held. Over each was placed adhesive plaster for the purpose of tightening and retaining the bandages in place. The first and second molars of the lower jaw had been lost, and through the space thus provided food could be introduced into the mouth by means of a glass tube, the diet being plastic food. It was considered necessary to leave the splint and bandages in position from four to six weeks, which is usually necessary for the union of the parts. The second case was that of a fistulous opening in the cheek, which had been under treatment of the family physician for several months. The face had been poulticed much of the time, and that was the only attention given it by the physician. There was a considerable discharge of pus, and the patient was very much debilitated by the drain on the system due to the abscess. The introduction of a probe, following the fistulous track, determined the presence of a non-erupted wisdom-tooth, showing this to be the primal cause of the difficulty. The gum was dissected away, and by the use of the elevator the tooth was lifted out, which constitutes the treatment of the case.

Dr. Ottolengui, of New York City, showed Dr. Kingsley's improved blow-pipe. As in the old one, the flame is regulated by pressure on rubber tubing, which is attached to the brass. The improvement consists of a hinged joint and lever to regulate the flame, so that it can be made either large or very finely pointed without going out entirely, and the apparatus can be laid on the bench while not in use. . . . The doctor also exhibited his gold crowns made without dies. His method is as follows: Put a band around the tooth to be crowned, making it the length the crown is to be; put a piece of platinum plate into the open upper end; flow gold over the top; try it in the mouth; grind it to the occlusion, and carve up the cusps.

Dr. F. E. Howard, of Buffalo, N. Y., showed his new method of adaptation of gold to cavities in filling teeth, the principal advantage of which is in filling cavities on the buccal surfaces of teeth which are extremely sensitive. For this purpose he first applied a varnish made of chloroform and balsam of fir, and then built a gold filling on it.

Dr. F. T. Van Woert, of Brooklyn, N. Y., demonstrated his new removable-crown system. The advantages of this system are, first, the fact that the teeth are not heated or soldered, thus avoiding the danger of cracking; and, second, the ease with which they may be replaced when broken from bridges without removing the bridge attachment from the mouth. A Gib wire is riveted to the porcelain tooth, which must have platinum pins. An instrument of his design forms a dovetail in a piece of platinum which exactly slides over this pivoted wire, and this backing becomes a part of the bridge, and when finished the tooth fits solidly into it, being firmly held by the cement. When a bridge is built, two sets of teeth are to be bought for the case: one to be used, the other retained for subsequent repairs. In case of a break, the new tooth to be added needs only to have the Gib wire pivoted in place, when it fits into position as readily as the original tooth. The doctor has applied for a patent on his system that it may be protected for the benefit of the profession, to whom he freely gives it.

Dr. C. S. Stockton, of Newark, N. J., was unable to give his clinics on account of the illness of both of his patients.

Dr. H. A. Parr, of New York City, exhibited his plate, bridge, and crown combined. The patient in this case was Dr. A. H. Gilson, of Boston. Dr. Parr put on three gold crowns, one of which was the Evans crown; prepared two molar roots; made the crowns, with cusps, etc., in fifty-five minutes.

Dr. George S. Allan, of New York City, exhibited a set of burnishers for finishing contour fillings.

Dr. J. G. Morey, of New York City, exhibited his root and crown drills.

Dr. E. Parmly Brown, of New York City, baked and made a case of porcelain bridge-work. He exhibited a case of four bridges in a lady's upper jaw. In this case the laterals had never erupted, and a plate had been worn which ruined the bicuspids and molars. Dr.

Brown made two laterals on "all-porcelain bridges," and attached the bar by gold fillings in the approximate teeth. The bridge, with two bicuspids and molar on either side of the mouth, is attached to the cuspids by gold fillings and to the second molars by gold crowns. The bar that passes through the porcelain teeth runs into a hole in the side of the gold crown and is turned at right angles to the bridge, forming a post to extend into the nerve-canal. This case has been in the mouth over a year, and everything is very firm, solid, and clean; the bridges press tightly on the gum, and it extends up around the cervical portions.

Dr. H. H. Keith, of St. Louis, Mo., exhibited a ratchet crank, to be attached to the Morrison chair for the purpose of raising the chair by means of the foot or hand. It has these advantages: the crank does not need to be removed; it is never in the way of the operator, and patients weighing from two to three hundred pounds can be raised without difficulty.

Dr. E. V. McLeod, of New Bedford, Mass., exhibited his combination filling, using Robinson's fibrous foil; making a chemical union between that and the gold with the use of amalgam.

Dr. F. H. McGeorge, of Corning, N. Y., exhibited a cement that differs essentially from all others, in that no zinc is used in its composition, and an amalgam that amalgamates instantly, so that with the use of mercury no rubbing is necessary.

Dr. L. D. Shepard, of Boston, Mass., exhibited in the mouth of Dr. W. C. Deane a large filling in a lower molar which was inserted by him at a clinic of the First District Dental Society ten years ago, with cylinders of non-cohesive gold, and introduced in twenty-two minutes. The walls are as clear and white as if the filling were just put in.

Dr. Kendall, of South Norwalk, Conn., exhibited a case of irregularity, the patient a girl fourteen years of age. It was a case of contraction of the upper jaw. A plate with Coffin spring was used, and worked nicely at first. The patient was detained at home for two weeks, and the teeth changed considerably. The first indication of trouble was a dark blue spot above the right central incisor, and the tooth elongated. The plate was removed and ligatures put on the tooth to hold it in place, but these were also removed, and the tooth continues to elongate. It could be pressed upward a quarter of an inch. The doctor was advised to construct an appliance to press and hold the tooth in its proper position until it becomes firm.

Dr. S. C. G. Watkins, of Montclair, N. J., exhibited a special gold prepared by the S. S. White Company, both soft and cohesive, something entirely new. He filled a cavity with the soft gold, finishing it with hand-pressure and the agate burnisher. An Ivory clamp was used.

Dr. L. L. Howard, of Riverhead, N. Y., exhibited a sand-paper disk-carrier; also a method of capping teeth with gold plate.

Mr. E. E. Clark, of Newark, N. J., exhibited the Ward's electro-metallic dental plate, which is made by depositing pure gold or silver directly upon the model, securing thereby a perfect fit. The only requisite to be provided is a perfect model. He says if broken it can be repaired, and is as strong after the repairing as it was at first; it can be soldered with 20-carat gold, and this strengthening of the plate with gold compensates for the annealing, and that the brittleness and porosity complained of have been overcome.

Dr. Miles H. Dodge, of New York City, exhibited a drill with flexible shank, to be used by hand or with the dental engine, for making retaining-pits where a straight drill will not do the work.

Dr. J. A. Bishop, of New York City, exhibited a regulating apparatus, made by himself, that has been used with great success.

Dr. H. H. Sisson, of New York City, exhibited his sheathed paper-disk carrier.

Dr. J. N. Farrar, of New York City, showed his appliances for correcting irregularities of the teeth.

Dr. J. S. Campbell, of London, England, exhibited his dental engine. It is light, noiseless, and strong. It can be hidden from the view of the patient and yet be in position for the use of the operator. (See page 37, DENTAL COSMOS for January, 1890.)

Dr. George Evans, of New York City, exhibited his gold seamless crowns, and demonstrated an improved form of root-drier.

The improved Gould dental chair was exhibited by L. W. Carr, 126 West Sixty-first street, New York City.

Dr. W. B. Ames, of Chicago, demonstrated by a practical case his method of securing retention of entire artificial dentures by atmospheric pressure. The patient had a flat mouth, but there was a wonderful degree of retention. The plate was extended posteriorly and toward the reflected tissues of the cheeks and lip far enough to give slight displacement of soft tissue by its entire periphery. Under these conditions there is retention by adhesion of contact until the force applied becomes sufficient to overcome this adhesion. When this occurs, there is a tendency to the formation of a vacuum beneath the plate, because of the displaced soft tissues being in contact with the edges, preventing the entrance of air beneath. With this form of plate the retention by atmospheric pressure is manifested only when a force that tends to displace the plate is sufficient to overcome the adhesion between the two surfaces.

Dr. George H. Wells, of Augusta, Ga., demonstrated his method of using tin and gold in combination, and claims that there is no necessity of undercuts to retain the gold independent of the tin filling.

He prepares the cavity as for gold, and depends on the adhesion of the tin and gold the same as if it were all gold, and uses cohesive foil with sharp pluggers to unite it to the tin; then any gold can be used. He claims it has advantage over amalgam and gold, it being more rapidly inserted, and that the structure of the tooth is improved by the combination.

Dr. John L. Gish, of Jackson, Mich., exhibited and explained the Gish ideal rheostat, for controlling the electric current from any incandescent light circuit. The rheostat consists of two parts,—a handsome little box, nine by ten by two inches, which is placed near at hand in any position desired, and a round portion, or resistance box, nine by ten inches, which can be put in the laboratory or any other convenient place. Plainly speaking, the rheostat contains but one bare wire, so arranged that when the circuit switch is closed the current passes directly from the street into and through both parts of the device and out again into the street. By an ingenious arrangement the operator is given a safe and absolute control over the current, and by simply sliding a button along a groove that runs parallel with the wire is enabled to take, by what is known as the drop or shunt circuit, just as little or much as is desired to operate the electric mallet, mouth-lamp, cauteries, root-drier, hot-air syringe, etc. In galvanism it admits of one's taking any number or fractional part of a milliampère, and in faradism it gives the operator complete range of both the primary and secondary currents. A strong point in favor of the rheostat is that in galvanism you can avoid all shocks whatsoever to your patients. The little device further recommends itself on account of its wide range of application and nicety of graduation, not jumping from point to point, but procuring a gradual rise in the intensity of the shunted circuit.

Dr. C. A. Timme, of New York, demonstrated his new furnace for continuous-gum work and for gilding artificial teeth in place of gold filling.

Dr. J. A. Kimball, of New York, exhibited a revolving instrument-stand, the body of which is made of turned wood about six inches in diameter, with holes in its upper surface to hold in plain view a variety of instruments such as excavators, pluggers, engine-points, etc. The body is supported on a metal pedestal, and has metal arms projecting from the top of the post to hold scissors, mouth-mirror, foil-carriers, syringe, floss silk, etc. The stand is intended to be placed on the bracket-table. . . . Dr. Kimball also showed a glass disk to be used in mixing plastic fillings, which is held on a metal base by a glass stem underneath. There are also four cup-shaped cavities in the base, intended as a receptacle for small instruments, etc. The disk may be depressed and used for pumice-stone while cleansing teeth, etc. . . . The doctor also showed an extension instrument-rest for holding excavators, etc., on bracket-table. It can be used as a removable partition in instrument-drawers. Also a removable rim for mouth-mirrors, which he suggests for use when inserting fillings or taking them out, to prevent particles falling into the mouth. It is made of thin spring steel, and with a groove, and is sprung over the mirror-back. Also a forceps, with two parallel blades forming each beak, for extracting roots beneath the gums ; a dentrifice-bottle with non-detachable stopper, and a non-separable disk-holder with disks adapted for the same.

Dr. E. T. Starr, of Philadelphia, representing The S. S. White Dental Manufacturing Company, exhibited their new cord dental engine, which in novelty of design and fine finish is every way admirable. The free and wide range of hand-piece movement ; the peculiar cord tension regulators which insure a constant rotation of the bit under all conditions of working pressure or positions of the hand-piece ; the close folding of the jointed arms upon the standard ; the balanced driving-wheel so journaled that the cord can be quickly put on or taken quite away,—are some of its novel features. There was also shown an electric motor put in place of the driving-wheel and treadle, and running the new cord engine in fine style by power from an incandescent circuit led through a new variable resistance. . . . The Kells electric system and horizontal bracket-arm with the S. S. White engine-head, provided with an electric brake or cord-gripper to stop the bit instantly, was exhibited. A new vertical and horizontal bracket cord engine automatically poises the hand-piece, which can be held at any angle, left suspended close at hand, or pushed up out of the way ; the electric motor, brake, and pedal switch being similar to the Kells. . . . Under like control was an electrical laboratory lathe and stand of superior construction and utility. . . . There was an elegant gasometer on casters for ready removal with its cylinder to any part of the office, but its principal feature is the novel poising of the floating bell, which is so sensitively sustained that no gas escapes when the gas outlet-valve is open, yet it responds instantly to the inbreathing of the patient without the slightest pressure on the lungs, and as instantly stops without pressure when the expiration begins. An additional safeguard is afforded by the inhaler-spring supply valve, which automatically shuts off the gas when the face-piece is removed.

Dr. E. B. White, of Philadelphia, demonstrated his method of making "full gold crowns," contouring and building up cusps, etc. He says that crowns cannot be properly contoured by simply clipping the cusp ends of the band with the scissors and only drawing in the edges as far down as the cuts extend. The crown of a natural molar or bicuspid begins broadening or swelling at the neck or just above, and continues until about half-way or more toward the masticating surface, when it begins to contract, and ends only in the complete formation of the cusps ; hence by clipping the band is only drawn in at one particular place, and the remaining portion is simply a straight tube without the merest semblance to a natural tooth-crown. He claims that the simplest and quickest way of making a contoured crown, after having perfectly fitted the band to the tooth, is to hold the band between the thumb and index-finger of the left hand, with the cusp end outward, and insert the narrow beak of the half-round pliers a little more than half-way, gently but firmly pressing outward with the end of the beak, at the same time drawing inward with the other beak, and by going carefully around the band in this way it can be very readily bulged at and on either side of the center, and contracted at the cusp end, thus giving a natural contour. The end is then faced by holding it on the side of a corundum-wheel. A piece of platinum about No. 35 is cut a little larger than the end of the band and made flat, and four globules (of the same metal used for the band) are placed upon it in proper position to articulate with the occluding tooth, and fused until the platinum is covered, but not enough to level the mass of metal, which should remain prominent for the cusps. Then a small oblong piece of the same metal should be attached across each end of the now formed cusp-plate, the platinum ground off with a corundum stone, the flat side held up with the pliers, and the surface end of the band placed upon it and united by placing a small amount of solder with flux in the center and holding in a Bunsen flame. The cusps are then carved with suitable burs, and burnished after smoothing the edges of the "cusp-plate."

Dr. A. H. Stoddard, of Boston, Mass., exhibited the "improved gas furnace," which is intended for baking porcelain fillings and continuous-gum work. Under ordinary circumstances it bakes in eight minutes. It has no muffle. (See COSMOS, vol. xxxi, page 699.) Several specimens of porcelain fillings were shown. . . . The doctor also showed a vulcanizer with an improved clamp for closing. The top has three levers which grip under the collar on the pot, and are operated by a single screw (with an insulated handle) which presses on the center of the top, and thus is easily closed or removed. There is also a large spiral spring in the pot that holds the flasks to the top of the vulcanizer, so they are in steam rather than water, and more easily removed. There is also a "flask press," made of steel spring frame, with a cam attached which is turned with a lever for tightening.

The working qualities—cohesiveness, softness, plasticity, and ease of manipulation and condensation—of the "crystalloid gold," Nos. 1 to 4, manufactured by R. S. Williams, of New York, were demonstrated by many visiting dentists in making hand-pressure fillings in a separable metal cavity, and then removing it and finding a plug with perfectly condensed walls. The gold is prepared by placing a layer of crystalloid gold between layers of foil, and made into pellets, which spread readily when condensed; the first pellet usually being well retained when placed in a cavity, making retaining-pits unnecessary.

Dr. A. H. Gilson, of Boston, Mass., demonstrated a method presented to the profession by Dr. Geo. A. Maxfield, of Holyoke, Mass., of uniting the ends of the ordinary band used in running the dental engine. Either end of the band must overlap from three to four inches the required length. The ends are then drawn into itself from this point, either way, by passing a loop of small wire through the side into the hollow band opposite the end of the part overlapping, and pushing it along through the center lengthwise to the point to be joined, where the loop is exposed again, when the opposite end of the band is passed through the loop, and drawn by the wire into itself the required distance, when the remaining end of the band is treated the same. . . . The doctor also showed his popular strips and disks for finishing fillings.

Dr. Frank B. Darby, of Elmira, N. Y., presented an appliance to prevent mouth-breathing, which was made of a thin piece of light-colored vulcanite rubber, broad enough to fit the space between the upper and lower lips and the teeth, with two vulcanite posts set on its anterior surface, to project between the lips at or near the position of the corners of the mouth.

Dr. M. L. Howe, of River Head, L. I., showed his new disk-carrier.

Dr. T. S. Waters, of Baltimore, Md., showed his new registry book, in which is kept a copy of all appointment-cards, which are printed together in the book. Dates, names, etc., are filled in, and the operation performed is recorded on the same page. The book is to be used in connection with a ledger.

NEW YORK ODONTOLOGICAL SOCIETY.

(Concluded from page 123.)

THE PRESIDENT. Gentlemen, we will have the pleasure of listening to a paper by Dr. Roy.

F. A. Roy, M.D., D.D.S., of New York City, read the following paper, entitled

A PORCELAIN CROWN.

The crown which has suited the greatest number of cases is probably the plate tooth, backing, root-end plate, and post soldered together. A rim, partial or collar, is often added to give stability to the crown and more or less strengthen the root.

In this crown there is always a space between the porcelain and the metal, very slight if skillfully united, but still enough to be accused of holding decomposing accumulations. The line of this joint is very liable to come near the point of contact with the adjoining natural teeth, endangering decay in them. This is difficult to overcome by having the porcelain thicker or wider, and if the metal be made to embrace the points of contact there is generally objection to the metal showing. No such joint is made in an all-porcelain crown, and the hard, glazed surface is the best sort of contact for the natural teeth.

The metal back of the soldered crown also gives it an undesirable opaqueness. We have the translucency of a tooth with a living pulp in the porcelain crown.

The several porcelain crowns with pins baked in them, that are now on the market, are as perfect for the purpose as need be, in favorable cases ; but it is not so easy to get that perfect adaptation that is depicted in the well-known illustrations. If you can fit a Logan or other ready-made pin-crown on a *strong* root by the Ottolengui method, for instance, so that the post fits the properly reamed pulp-canal tightly and the base of the crown is perfectly adapted to the end of the root, with the alignment of the surfaces of the root and crown correct and the porcelain left thick and strong, then you need nothing better. But often the adaptation is not perfect, leaving a large joint space, at first filled with cement, but which soon wears out, exposing the root-end to decay. Commonly, too, the crown base projects over the root-end, though this is easily rounded. If the crown does not cover the root, it can be added to only by baking on more porcelain.

It has long been settled that the theoretically ideal crown, built up with and shaped out of a mass of tooth-body, and baked for each case, was impracticable because of shrinkage, want of strength in a tooth not pressed in a mold, and especially the impossibility of obtaining a correct or wished-for color. But by selecting a piece of porcelain already baked, of the correct color, we can add to it and produce an almost ideal crown. The Logan crown is the most available on the market, being made and found in stock in a larger variety of natural colors and shapes than any other. This enables us to select positively a crown of good color and almost the right size and shape. These latter points are made up by adding porcelain for contour, both for appearance and for contact with the adjoining teeth, and for correct occlusion. Then the adaptation to the root is made perfect, fitting a cap or plate for the root, and combining the cap with the pin-crown.

The pulp-canal is of course previously treated, prepared, and filled. When possible I wedge a little each side of the tooth, thus making sure of enough contour for good contact. Cut off any of the crown remaining with a wheel or other bur from the inside, which will remove large pieces quickly without danger of splitting the root. If too thick for the bur, use a drill from the *inside.* Dress the root end down with corundum-wheels till nearly flat, and nearly to the gum line on the interior lingual or palatal side, and below the gum on the exterior labial or buccal edge to get the joint line under the gum. I have often started trimming, intending to leave more tooth at the back, but ended by making a nearly flat surface. With a gold collar crown this excess might add strength, but in a porcelain we need all the thickness we can get, and the inclined plane necessitates a strong collar to take the strain of occlusion to keep the crown from sliding off, and breaking the pin or root. The flat surface gives square resistance to occlusion.

Now fit the crown, having selected one with special reference to its needing little or no addition to the face and the least possible grinding on the occluding surfaces. The same color cannot be added unless you have the same batch of material the tooth was made from, or some of the tooth itself ground up. By having sample bakes of the different shades one has in stock the nearest shade may be selected, but not without an immense number of shades could we be ready for even the majority of cases presenting. Any excessive grinding weakens the crown, especially if near the pin, as every tooth has checks near the metal, and the outside glazed layer is the strongest part of the porcelain. Enlarge the pulp-canal with Morey drills. A large one will ream the opening, allowing additional variation in adjustment with the hollow in the crown. This hollow base gives the Logan an advantage over the Brown crown in adjustment, and the Brown base necessitates too much cutting of the root and is hard to grind around the pins. Then by using a Morey drill the same size as the thickness of the pin, drill as deeply as you wish or dare, continually trying in the pin, enlarging for the *width* of the pin by drilling up and down the front or back of the canal. As the crown approaches the end of the root grind the edges, taking great care the crown is in the proper place in relation to adjoining teeth and occlusion. Usually the pin must be bent, the two countersinks allowing of quite a deviation from a direct line. Adapt perfectly to the exterior edge of the root, with the bite a little short to allow for the thickness of the cap. The pin should fit snugly. Round its end rather than weaken it by cutting too short, or the root by drilling too much. The grinding can be done rapidly, and safely for the pin, by covering the pin with a tube a little longer than the diameter of the corundum-wheel, whereby it can be held between the thumb and forefinger while an unobstructed view of the work is had. If when the exterior edge fits, the interior edges are not open, then bevel the porcelain freely to give room for putting in the body.

If making a cap, trim the periphery of the root-end till slightly coned. Even if only a plate is used, I bevel or round the edges. Cone fissure burs with short shanks used in a shoulder-guard to prevent slipping up into the gum give the right shape, though leaving a roughness which must be smoothed with Starr's reducers or Smith's coarse plug-trimmers with shoulder-guard, or perhaps How's new root-trimmer. Often the anterior and posterior edges need extra cutting with disks or files (in a carrier as a guard), so that there shall be room for the gum between the teeth after the cap is on. Cocaine is of some use here and in burnishing on the cap, but the rim of the cap should not go farther than to the union of the gum-tissue with the tooth, thus avoiding peridental irritation. Take as good an impression as is possible of the root-end in plaster. Trim to fit in one end of a rubber tube and pour a soft metal model. Trim as nearly as possible to the shape of the root. Take platinum and iridium plate No. 30 to No. 60, anneal well, press up on a block of soft rubber, which gives the outline, and bend up the rim with small-pointed flat and quarter-round pliers, burnishing into the model, thus getting a tolerably close fit, enabling one to cut off the surplus before the final burnishing in the mouth, where the plate or cap can be held in position by a foot-plugger. Anneal frequently, and keep the rim drawn in with the pliers while burnishing. A burnisher can be used with the shoulder-guard. Carefully select the point on the cap, and drill for the pin not quite large enough. Push the crown to place with a sticky mass of wax worked up in the fingers. This wax, with the aid of the bur of the drilled hole into which the pin was forced, keeps the tooth in place till invested. Cut away enough of the wax to let the investment take firm hold of the cap. Asbestos wet up makes a good and quick investment when well wound with binding-wire. Solder with pure gold into the bur around the pin. With a small sharp drill bore a few holes from inside the cap, thus putting slight burs on the surface to hold the added porcelain, being careful not to disturb the position of the cap in drilling.

I like to try in the crown now, but generally go right on in the absence of the patient, doing this work generally at night, as there is then a better flow of gas for the furnace. Select the best color body, mix, pack tightly into space between cap and Logan, and add in every point where necessary an excess so that if possible a second bake will finish, though generally a third is needed. With a thin blade divide the body in the space and any additions so that it shall crack in the middle of the body and not draw away from the metal or flake, and the V-shaped groove is easily filled. This crown is applicable in about one-quarter of the cases presenting. It will not do in long over-bites for thin faces or very short cusps, which need tough metal backings or supporting shells that destroy translucency. Porcelain must be thick to stand alone. The pin baked directly in the pressed tooth gives greater strength than with a separate pin. The two countersinks give a wide range of adjustment. The plate gives a perfect fit to the root, with the rim strengthening it almost as much as a ferrule, and giving a positive guide in trimming and shaping the base of the crown. I like to have the crown a little larger than the root, beveled or rounded a fiftieth to a sixteenth of an inch from the plate. The gum heals best against a shoulder, and this contour protects it from the food in biting or masticating. I have seen the gum come down hard and nicely over smooth round shoulders, but never over the opposite, a ledge offering lodgment for material driven over the face of the tooth. I am in hopes that in a furnace giving a great heat rapidly, a surplus of tightly packed body will melt down solidly, shrinking, but not cracking, as it does in the hardening stage of a slower process, thus finishing in one bake. In placing the crown, if the pin is a little loose, give it a *very* slight double bend with the quarter-round pliers. The root-canal and the pin should, as usual, be laterally grooved.

Discussion.

The President. Gentlemen, have you anything to say on the subject of this paper? The crown presented seems to be a very perfect sample of work. The subject is open for discussion.

Dr. W. H. Dwinelle. I think I can commend it. It seems to be an improvement upon some others that have preceded it.

Dr. V. H. Jackson. I would like to thank Dr. Roy for getting up this crown and presenting it, with his method of construction. I would also like to ask him what furnace he uses. He spoke of the crown requiring three bakings. How much time is consumed?

Dr. Roy. That is the disappointing part of any porcelain crown. With a furnace with which we could bake rapidly, I think this crown could be made much more easily than the Richmond crown. This sample has only two bakes. It should have a little more material added to it, and then a third baking. I am using a Land furnace, and that is certainly slow, but I do not use it *as* a Land furnace.

Dr. S. G. Perry. Do I understand that this crown is set with zinc phosphate?

Dr. Roy. It is supposed to be set with either zinc phosphate or gutta-percha.

Dr. Perry. I cannot get over the feeling of distrust in the future of such a joint as that, and that is one reason I have abandoned, as far as I can, a similar method of setting crowns. The Logan crown is set in that way, and I think it is a fatal weakness of that crown that there must be an exposure of the joint, for decay commences around the joint in course of time. For that reason I try to get an absolutely tight joint, that will be so permanent that nothing can change it. I should set the pivot in the root, and make a thin filling of gold over the end of it so as to make a "washer" of gold; I should then set an old-fashioned pivot tooth with zinc phosphate. If I could not find a suitable tooth, or if I wanted great strength, I should fit a thin piece of platinum on the end of the root and a loosely-fitting platinum cylinder on the projecting pivot, and having ground a plate tooth to fit I should take a red-compound impression of the parts in place and then solder the cap, cylinder, and tooth together. This would give me the equivalent of an old-fashioned pivot tooth, except that the under side would be made of gold. This tooth I should set in the projecting pivot with zinc phosphate in the usual way. This secures absolute durability to the root. I have never yet seen an instance where the zinc phosphate did not hold the tooth and pivot together. I can see how such a tooth as this of Dr. Roy's could be readily articulated, and that is a great point gained.

Dr. Roy. That is a Logan crown simply shaped up.

Dr. Perry. I may be talking into the air, because I did not hear the description of this crown. I supposed you had baked this on a platinum band, with a platinum pin.

Dr. Roy. Yes. I use the Logan crown, with the pin already baked in the tooth under pressure, which makes it stronger than if we take the pin and the cap separately and then add the material.

Dr. Perry. I would only criticise that method of making a joint. Do I understand that the metal is slightly turned over so as to form a cap?

Dr. Roy. I always do that; that is, where there is any room to make a cap; I always bevel the edge a little bit. It makes a better joint.

Dr. Geo. Evans. As to the question of the prevention of fermentation in the mouth, to the injury of the joint, the danger of that is very slight indeed when the metal is burnished closely over the end of the root so as to form a cap. Where the zinc phosphate at the joint is not thicker than a sheet of paper, I do not think it can wash out.

Dr. Perry. This tooth here shown is evidently done out of the mouth; but is there any human skill by which we can get, in setting the tooth, just enough zinc phosphate and no more? There is no vent-hole.

Dr. Evans. The zinc phosphate is supposed to be very thin; then a burnisher is afterward passed around the gold collar. There is an advantage here obtained by forming a collar or cap of nearly pure gold, because after the band is cemented in position the gold can be burnished close to the tooth. I think the crown that Dr. Roy has presented this evening possesses some very great advantages. We have platinum at the cervix, which resists the acid fluids of the mouth better than any other material, and we have porcelain body, which is more natural. For bicuspid crowns I think it has many advantages over the Richmond system. A gold cap crown with a porcelain front for bicuspids is one of the most difficult crowns to make artistically. I think the crown that Dr. Roy has presented could be formed and finished in less time than a gold crown could.

Dr. Perry. I do not doubt that; but that does not touch the point which I raised. It seems to me that as fine a joint cannot be made with any sort of a cap that can be put upon a tooth as is the joint made by putting a gold filling on the end of the root. Finish the filling perfectly, then set the crown on that, and the operation will be as lasting as anything that can be made. In that way the root can be saved, and if anything breaks it will be the crown, which should always be the weakest, and which is easily replaced. If I set a thimble, as of course it is necessary to do on a frail root that may split easily, I bevel the end, and having fitted my band, cap and pivot, and having soldered the three together, I drill one or two vent-holes through the cap. After this thimble is set, I fill the vent-holes with gold and then proceed to fit and set the tooth on the projecting pivot. When the tooth is set in this way, the excess of zinc phosphate does not go down between the band and the tooth at all, but comes out through the vent-holes drilled through the cap, and allows the whole structure to go to its intended place.

Dr. Cook. One question of Dr. Perry. Given a root sound, solid, even with the margin of the gum, how will he fill the end of the root with gold?

Dr. Perry. There are very few roots that I cannot put the rubber-dam on, and make it stay on, with such devices as I have; and when the dam is on there is no trouble in filling on the end of the root and around the pivot. Sometimes I put a band on, and then fill into that band without using the dam at all. I have done it dozens of times. A coffer-dam can easily be made of a band of metal and slipped over the end of the root, after which dry out and fill in with gold. I am sorry I did not bring some dam-depressors that I have. I use them for holding the dam back more than anything else.

I have here a set of excavators. There is nothing specially new in these instruments, except a peculiarity of design by which the blades are made somewhat like a battle-axe in shape. To distinguish them from other instruments in my office they have come to be known as the battle-axe excavators. One distinguishing feature is the great slenderness of the shank, while the round cutting-edge is intended to fit into the round contour of cavities. Another advantage of the round cutting-edge is that it ''bites'' only in one place, and where it bites it takes hold. A round-bladed excavator always cuts well in any part of a tooth. In sharpening, the round edge is easily kept by a rolling motion of the hand. These excavators vary in size from very fine and delicate ones to larger sizes, the idea of the round face and cutting-edge being carried out in all. The ends of the handles are rounded smoothly so that they will rotate nicely in the palm of the hand. It is a surprising thing to me that instrument-makers should all these years have been to so much trouble to make instrument handles that might be called pretty, scalloping and knurling them, and doing everything except to make them perfectly smooth and simple, and, therefore, more artistic as well as more agreeable to the hand. The octagon faces of the handles are left smooth, and they are tapered gradually, with no attempt at scalloping or ''finishing'' where the joint and handles join. They are blued so as not to weary the eyes by their glistening surfaces. The octagon faces give all the feeling of firmness that is needed in grasping them, without keeping the hands hard and rough, as is the case with knurled handles. It is surprising to me that this style of instrument, which is simplest, is the one form of all that has not been made, because it is the cheapest and requires less work than any other form. There are twenty-four in the set, running from the smallest to the largest size needed ; the largest ones being for opening into cavities and cutting down crown surfaces, and the others for work in the interior of all cavities.

Dr. Dwinelle. Where are they made?

Dr. Perry. They are made by the American Dental Manufacturing Company, Thirty-fourth street. I think they have copies of the patterns.

Dr. Dwinelle. We have all learned to know that our friend Dr. Perry is full of good ideas. I can commend these instruments, and I feel that everyone who has seen them will commend them. I do not doubt that every man present will have a set of them. They are very beautiful, and the chief point of beauty is the rounded surface coming to a square point or edge. I think he is to be commended for this expression of his inventive genius, and I hope he will remember us in the future when he gets anything new. I hope he will devise some way by which we may be able to obtain an engine like the one he is using every day. We were promised that a good many months ago. I hope he will devise some way by which the whole profession can get it, for I think it is the best engine in the world.

Dr. Perry. I have been helpless in the past, and I do not know what the future may bring forth. I want to make one remark in connection with that engine, and that is in reference to the use of electricity as a motive power. I have recently had put in by the Edison people a switch-board which controls the current that comes to me from the street, and I think I can safely say that it is perhaps the final improvement in my office. It seems to me as if I have almost nothing more to ask for in the way of facilities for doing my work. This, I think, is the last and almost the most important aid that I have in my office. The engine is now run by the electric motor, and I have ten different speeds which I can control by a touch of the finger. I can stop the motor in a moment by a touch of the hand, and the engine is constructed so that I can stop the engine itself in an instant by taking hold of what you might call the balance or fly-wheel of the hand-piece. At any time, no matter what the speed may be, I can stop the current, and with a pinch of my finger I can stop the engine. I have never seen any device for stopping an engine that I think is as complete as that. Some day, when all the gentlemen present get the electric current into their houses and are able to control it, as I do now, I am sure that their working capacity will be greatly increased, to say nothing of the greater comfort. The electric light for illuminating the mouth, and the motor itself, are simply indispensable, and last summer the electric fan changed the climate of my operating-room to that of Northern Canada.

On motion of Dr. Cook, the thanks of the society were extended to Drs. Sanger and Roy for their interesting, able, and instructive papers.

Adjourned.

S. E. Davenport, D.D.S., M.D.S.,
Editor New York Odontological Society.

INTERNATIONAL DENTAL CONGRESS.

(Concluded from page 144.)

Dr. Kuhn, M.D., from Paris, made a communication on the "Application of Electricity and Compressed Air to the Instruments used in Dentistry." [The description of the apparatus which follows would be unintelligible without cuts.—Ed. Dental Cosmos.]

In addition to this apparatus, Dr. Kuhn showed to the members of the congress present the combination of compressed air and electricity applied to dental instruments. He showed Brasseur's thermo-electric hot-air injector, which consists of a tube retained in a case of ebony wood, through the middle of which passes a platinum wire which can be heated red hot by electricity, while at the same time the pneumatic force accumulated throws over it a current of air, which, when it comes out, is heated and can be used for drying cavities.

He also presented a modified Paquelin's cautery. The wooden ebony handle contains a cylinder in which there is a sponge impregnated with benzole or purified petroleum ; the compressed air passing through it carries with it the vapors of petroleum, which retain the platinum point red hot, which does away with the bottle and hand bulb rubber usually employed.

Finally, a Francis Jean hot-air injector, consisting of a metallic reservoir, cylinder shape, and containing a certain metal preparation, which retains the heat perfectly well ; this reservoir is heated for five or six minutes, and then compressed air being forced through it, it comes out hot at the other extremity.

Dr. W. G. A. Bonwill, from Philadelphia, gave an interesting description of his "anatomical articulator," which was listened to with great attention by all the members of the congress present. This articulator is, we suppose, well known to American practitioners, rendering a description unnecessary.

Dr. Gaillard, M.D., from Paris, made a communication on a "Special Plate for Regulating Teeth." The same general shape is given to the apparatus whether the teeth are to be thrown out or pushed in. It consists of a crown plate made of platinum, covering the whole three posterior teeth on each side, the crown extending down to the gum, on the lingual as well as on the labial or cheek side. These two little crown plates are united by a platinum band soldered on the outside of each of them and passing in front of the teeth. The platinum band is flat and about a line broad. To this band, looking toward the cutting-edge of the teeth, is soldered all around a small platinum wire disposed in a festooned shape, so as to leave little spaces through which pieces of rubber or silk can be passed. For regulating, the plate is always tied in position ; children cannot remove it. For this purpose, on the side of the platinum crown mentioned above as covering the molars and bicuspids, little holes are made in the grooves indicating the separations between the teeth ; these holes are made at the inside, as well as on the outside, of the crown plate, and through these holes thread or silk is passed and fastened to the corresponding tooth. For sake of cleanliness this plate is removed every week by the operator himself and replaced in position.

The band being situated on the outside of the teeth. if we want to bring teeth forward, we secure rubber behind the particular tooth and attach it to the band in front of it ; if, however, we wish to push a particular tooth or several teeth backward, all that is necessary is to place a sufficiently large rubber between the tooth and band, the expanding force of the rubber pushing the tooth or teeth backward.

Dr. Michaëls, from Paris, made a communication on "The Use of Non-conductors before Introducing a Filling." To prevent the inflammations which are to be so much feared when a filling is placed too near the pulp, he advises that under every filling a non-conducting substance should be placed. He recommends "paraffined asbestos," prepared by taking asbestos paper and passing it through the alcohol lamp; when the cellulose has been destroyed, he covers it with a layer of heated paraffine. This preparation is indestructible and an excellent non-conductor. In addition to this non-conductor, he always applies around the cavity semi-fluid hypophosphite of calcium, which in time is transformed into calcium phosphate. This hypophosphite was recommended some years ago by a dentist in America.

Dr. Michaëls also gave a description of his mode of introducing amalgam. As we know that the amalgam of Sullivan or copper amalgam possesses remarkable prophylactic qualities against caries, the author has tried to use it in certain parts where the color would not appear, and place less easily oxidizable amalgam on the exterior. He first reduces the copper amalgam into an impalpable powder, and introduces it into a bulb air-syringe of his own make. When the cavity of a tooth has been well prepared, he applies all around the cavity an antiseptic varnish, and before this varnish is dry with his air-bulb containing the powder he dusts it all over the cavity, so that a slight film will adhere all around. The cavity is then dried with hot air, and the other amalgam is then introduced.

Dr. Gaillard, from Paris, read a paper on the "Advantages of Using the Muscular Force of the Patient as a Means for Condensing Gold." This he obtains by a special instrument of his own device: it is a forceps, which works in an analogous manner to the clamp forceps; that is, if the patient bites on the ends of the two beaks of the instrument to force them together, it requires on his part a great expenditure of muscular force to overcome the action of a very powerful spring which forcibly keeps the two branches separated. When a masticating surface cavity has been filled with soft gold, the end of this special forceps is placed on the filling and the patient is asked to open and close his mouth several times in succession on the two ends of the forceps; this brings about such a condensation of the gold as can be obtained by no other method. For approximal surfaces the author also presented a series of very useful compressing-forceps.

Dr. Michaëls read an article on "A Rapid Method of Making a Gold Plate," followed by a practical demonstration. In half an hour he made a gold plate of four teeth, the time for the setting of the plaster not being counted. The author uses a special gold plate, which is very thin and pliable; it can be worked like sheet-lead. This sheet-gold is smooth on one side and quadrilated or roughened on the other. A good impression must be obtained with gutta-percha. In this impression he runs a mixture of two parts plaster to one of sand, and obtains a model about an inch in height. He then adjusts on this model the teeth as well as the clasps; when a clasp is well adjusted, he tightens it somewhat, and pushes it with force into its proper position, so that it cannot be displaced. When the clasps are in place he takes a piece of sheet-lead and cuts it according to the shape he wants to give to the piece, and having marked the upper surface, he places it on the gold plate described above, and cuts a piece out according to the pattern. He then takes this piece of gold and places it in position, the smooth side of the plate in contact with the plaster, while the roughened or quadrilated surface looks upward; this is adjusted into position with a good burnisher or other similar instrument. To retain this plate in position he drives little nails about half an inch in length by the side of it into the plaster, and with a pair of pincers he turns the ends of them so that they press on the plaster surface and render the plate immovable. The teeth are then placed again on the model and plate, and retained in position with hard wax. He then invests the teeth and model in a plaster and sand mixture, while the wax is washed off with boiling water; of course, the whole upper quadrilated or roughened surface must be left exposed, as it is by running solder all over this plate that he obtains the desired thickness. When the plaster is dried, all the spaces that may be left between the plate and backings of teeth or clasps are filled with small scraps of platinum foil made into pellets and pushed into position. After the whole surface and backings have been well covered with borax, the piece is ready for soldering.

Mr. Barrie, D.E.D.P., from Paris, read a paper on "The Use of Muriate of Cocaine as a Hemostatic." The author recommends in dental hemorrhages the use of cocaine in the following manner: The alveoli are well washed with a solution of two per cent. muriate of cocaine, then into each alveolus introduce cotton saturated with a twenty per cent. solution of muriate of cocaine. A piece of spunk is placed over the opened alveolus, and the whole maintained in position with an apparatus which is a modified clamp of a particular form,—one for the upper and one for the lower jaw.

M. Godon, D.E.D.P., from Paris, made a communication on "Dental Education," in which he concludes that a dental school is the best method for giving a thorough education to the student,—much superior to professional preceptorship, which is only useful so far as preparing a student to follow with profit the course of a dental college. To obtain the most benefit, the dentist must have received a preliminary education on general subjects before he takes up his special or professional studies. He ought to have a fair knowledge of the language of his country, arithmetic, geometry, algebra, history, geography, elementary physics, chemistry, mechanics, natural history, drawing, and practical knowledge of the working of metals, as well as one or two of the living languages, English or German for example.

Professional education must be given both practically and theoretically. Three hours a day should be devoted to clinical instruction or mechanical dentistry throughout the course, which should be extended over three years. The first year should include the study of physics, chemistry, mechanics, natural history, elementary anatomy and physiology. The second year should be devoted to anatomy (dissection), physiology, pathology, therapeutics, and materia medica ; the third year to dental anatomy and physiology, dental histology, special pathology, diseases of the mouth and teeth, special therapeutics, treatment and filling, anesthesia, dental prosthesis, and professional ethics.

Every dental college in the world ought to require from its candidates similar examinations for obtaining the degrees.

M. Preterre, from Paris, made a communication, with demonstration on patients, on "The Parallel between Surgical and Prosthetic Interferences in Cases of Cleft Palate."

M. Barrié, from Paris, read a communication on "The Use of Platinum Plates to retain Implanted Teeth in Position." The author, after having asserted the necessity of retaining implanted teeth immovably fixed, reviewed the different methods used for this purpose. The silk ligature, under form of an 8, maintains the tooth very badly in place, especially as regards its length ; the masticating movements as well as the conical form of the tooth having a tendency to allow the ligature to drop down and to irritate the pericementum. As to the rubber-dam, which has been recommended by Herbst, it cannot be applied in every case, especially if there are not adjoining teeth, or even if the teeth are too close together ; there is also difficulty in applying it over the molars, and a useless pressure of the dam on the neighboring gum, while all that is necessary is a pressure on the end of the tooth itself. He recommends the use of platinum plates, which he claims can be made in a very short time, are very light, can be easily adapted, do not occupy much room, and retain the tooth perfectly well in position. The points of contact of the plate with antagonizing teeth can be easily removed with the corundum-wheel.

M. Eilertsen, D.E.D.P., from Paris, read a paper on "Repairing of Teeth with Enamel." If the cavity is a central one,—that is, surrounded by dentine and enamel on every side,—we need only adjust a piece of tooth very carefully. If, however, the cavity extends to the approximal surfaces, we must obtain strong retaining-points. If the posterior wall of the tooth is present, a small hole is made through it with the finest drill ; a piece of enamel is then adjusted to the cavity. To retain it in position a small hole is made half-way through the thickness of the piece of enamel, and a piece of platinum pivot is placed in it and baked after having been surrounded with porcelain paste ; the pivot is adjusted so that when the piece of enamel is placed in the cavity the pivot will come out by the opening made in the posterior wall of the tooth itself and be riveted in position after the cement has sufficiently hardened. If the posterior wall is not sufficient, it is replaced by a piece of platinum plate, which is also perforated so as to allow the passage of the platinum pivot holding the piece of enamel. The platinum plate is retained in position by small pivots soldered to it and which fit into corresponding retaining-points, made in the substance of the tooth itself. If the greater part of the tooth is gone, metallic crowns can be adjusted having an enameled surface on the part which comes into view.

M. Eilertsen also read a paper on "Hot Air and its Medicinal Properties." Hot air is used in dental surgery for two purposes,—first, to dry the cavities in cases of sensitive dentine ; second, to disinfect dead teeth. For the drying of cavities a temperature of 40° to 50° C. is sufficient. For disinfecting much higher temperatures are necessary. Some years ago it was proven that dry hot air at a temperature of 130° C. for half an hour was not sufficient for disinfection, while moist air under pressure at a temperature of 112° to 115° C. for a quarter of an hour destroyed all micro-organisms. Moist air under pressure cannot be used in the mouth, hence we must use dry hot air at a very high temperature. For this purpose the author uses very small metal tubes of a similar diameter throughout, which when heated at one extremity deliver hot air at the other. For instance, if a tube one millimeter in diameter and twenty centimeters long be heated at one extremity, we can obtain at the other end hot air from 100° to 200° C.

To increase the disinfecting power of the hot air it is passed through disinfectants ; for instance, carbolic acid heated at 50° or 60° C. becomes doubly more powerful as a disinfectant. As it is difficult to have the air to pass through an antiseptic liquid, the author has adopted the following method : A thin metallic tube is perforated by a large number of holes ; through these are pushed pieces of cloth impregnated with the special drug ; the whole is placed in a glass tube. This is then adapted on the metallic tube, which is heated, while at the other end is placed the part of the tube which penetrates the tooth. The hot air, passing through the metallic tube containing the drug, comes out impregnated with antiseptic vapors.

At the last meeting of the congress, Dr. A. W. Harlan, from Chicago, presented a communication from the dental societies of that city, inviting the congress to decide that its next meeting should be held in the city of Chicago in the year 1892. After a short discussion, it was voted to refer the matter to the dental section of the International Medical Congress, which meets in Berlin next year, and allow that body to decide upon this question.

The congress then adjourned.

PRACTICAL DEMONSTRATIONS.

In the name of Dr. Arkövy, of Buda-Pesth, Dr. Rothmann presented, first, artificial crowns mounted half in porcelain, half in gold ; second, improved gold crowns for molars. His crowns are retained in position with gutta-percha. For the porcelain and gold crowns the space left between the two, as well as the root-canal, is filled with gutta-percha ; the tooth is held in its place by a pivot fixed to the artificial crown, which is pushed in position by heating first the pivot. The gold crowns are hollow, but have in the middle a very strong, irregular pivot, which is longer than the crown, so as to enable it to penetrate into the pulp-canal, which has been enlarged and filled with gutta-percha.

Dr. Aubeau, of Paris, made a demonstration of anesthesia,—on one patient with nitrous oxide, on another with chloroform. He recommends to auscultate every person before giving an anesthetic, and to watch the patient with the greatest care during the process. He particularly recommends in anesthesia, either by nitrous oxide or chloroform, to occasionally ask the patient to lift the arm or make some voluntary movement, which the person will do before anesthesia is complete, but will not respond when it is complete. The abolition of the palpebral reflex is another certain sign of complete anesthesia.

Dr. Bleichsteiner, of Austria, gave a clinical demonstration of the mode of injecting cocaine, with complete success.

Dr. Bonwill, of Philadelphia, made a very large gold filling in a first upper molar, the cavity involving the whole anterior wall of the tooth to the neck, as well as nearly the whole masticating surface. The cavity was filled with No. 20 cohesive gold. The operation was completed in less than an hour. The doctor used the mechanical mallet with smooth points.

Dr. L. C. Bryan, of Basle, Switzerland, presented a series of matrices, to be used in filling teeth either with gold, amalgam, or cement. These matrices are very simple, and easily placed ; they are rings made of a very thin spring ribbon steel, the ends being soldered with copper. The author has made a series of thirty, which can be adapted to every possible case, even on the roots ; the matrix is retained in place simply by placing a piece of wood or metal between the surface of the tooth and the matrix.

Dr. J. S. Campbell, of London, presented a new motor engine, running horizontally instead of vertically, as the ordinary engine.

Dr. R. Chauvin, of Paris, made a clinical demonstration of his way of injecting cocaine, using a two and a half per cent. solution in distilled water ; he injects only half a centigramme of the cocaine at one time, so as to be able to stop the injection as soon as bad symptoms appear. He also gave a demonstration of a soft gold filling. The tooth operated upon was an upper right superior first bicuspid. The cavity involved the greater part of the masticating surface, and the whole posterior approximal surface down to the neck of the tooth. The gold filling was made exclusively with soft gold cylinders. They were placed in three different positions,—horizontally for the lateral posterior surface, obliquely for the angle of the tooth, and vertically for the masticating surface. This filling, which would have taken an hour and a half with cohesive gold, was made in a quarter of an hour.

Dr. Chauvin demonstrated how to place, in crown-work, the pivot of the plate in a parallel direction. He used the tube pivot, and demonstrated how to fix the tube in the root with soft or non-cohesive gold cylinders ; he presented a specimen of bridge-work carrying eight natural teeth and held in position by three parallel pivots. He finally made a reimplantation, with fixation of a natural crown. The root of an inferior cuspid was taken out of its alveolus ; this root being square-shaped beneath its neck, could not have been used to fix an artificial tooth directly on it. The diseased part of the root was removed and a crown adjusted on the remainder, a pivot having first been fixed to the crown by means of a gold filling around it ; finally the crown was fixed on the root by means of cement. The tooth was then reinserted one hour and a half after the extraction.

Dr. William Dall, of Glasgow, demonstrated his process of making pieces of enamel for inserting into cavities, and thinks that enamel pieces can be made to fit almost any cavity.

Dr. Dubois, of Paris, gave a description of the instruments, as well as of the very interesting and complete collection of the different methods of crown-work, sent by The S. S. White Dental Manufacturing Company.

Dr. Franck, of Vienna, presented a pair of forceps for the straight removal of the crowns of decayed teeth without fracturing the roots.

Dr. Gaillard made a practical demonstration of his forceps for condensing soft gold. He experimented on a gold filling which had just been made with soft gold and had been condensed with Bing's forceps and the leaden mallet. The surface of the gold was smooth all over the filling, and could not be penetrated by an excavator ; notwithstanding this, Dr. Gaillard was enabled to condense the filling still more without danger to the tooth.

Dr. Gartrell, of Penzance, England, presented his new process of bridge-work, which is certainly very ingenious, and deserves to be carefully considered. The object of this process is to be able to easily remove the bridge at any time in case of accident or otherwise. It consists in fixing a gold metal bar three millimeters in height and one in breadth at its two extremities to the neighboring teeth. On this bar, which is permanently fixed, is adapted the bridge-work, which closely fits the bar and prevents it from moving about, while the patient can remove the plate at any time, if necessary, without the slightest difficulty.

Dr. Godon, of Paris, presented a small ingenious apparatus insuring the parallel fixation of the pivot tubes into the roots in cases of bridge-work. He also presented a case of implantation. The tooth to be implanted had been preserved for fifteen days in alcoholized water. The root of the implanted tooth being of smaller diameter than that of the alveolus, Dr. Godon added a piece of root obtained from the extracted tooth, placing it between the tooth and alveolus like a wedge so as to retain it in place. The operation was a success at the time of its presentation.

Dr. Guerini, of Naples, demonstrated his process of filling teeth with white coral. He takes a piece of coral and shapes the end of it to the size of the carious cavity. He then cuts a groove around it immediately above the point where he wants the piece to break off. He then introduces cement in the cavity, and places the piece, which is not yet detached and which he holds like a pencil in his hand, in the cavity ; he keeps it there until dry ; then the slightest lateral motion separates the small piece, which is retained in the cavity, from the large piece ; the whole surface is then equalized with a corundum-wheel, and the operation is complete.

Dr. Heidé, of Paris, presented a patient for whom he made a double gold crown by uniting two teeth. For making his gold crowns he cuts a piece of pure plate gold in the form of a Maltese cross, and then adapts it on the model tooth, then solders the sides of the arms of the cross. In the interior of the crown he solders a very strong retaining-pivot. The roots having been prepared, the whole crown is set with cement.

M. Francis Jean presented a thermo-injector, or hot-air syringe, of his own invention. The apparatus works like Richardson's spray apparatus. It consists of a metal reservoir terminated at one end like a small syringe canula ; at the other, where the air comes in, by a large opening. This metallic part of the injector is protected by a case of ebonite, except the canula end, which is to carry the hot air in the tooth. To use it the metallic part is easily taken out of the case and heated over a spirit lamp ; when this is quite hot, it is introduced into its wooden case, and the air is then forced through it with a Richardson's spray bulb and comes out heated during several minutes.

M. Legret, of Paris, presented a new gas blow-pipe of very simple construction.

Dr. Lehr gave a description of how to anesthetize a patient with the bromide of ethyl. The patient must first be auscultated, to find out if any organic lesions are present, then placed in a horizontal position, and the clothes loosened. The inhaling apparatus is charged with ten to fifteen grammes of bromide of ethyl, and the patient asked to make two or three aspirations, half of air and half of the anesthetic ; the inhaling apparatus is then completely applied on the face. One minute is sufficient to produce anesthesia which lasts from two to three minutes.

Dr. Levett, of Paris, gave a demonstration of the use of crystalloid gold and also of his new matrix, which last is a very simple one, and consists of a thin piece of soft metal ribbon at one end of which a buckle has been made. For use the ribbon is placed around the tooth, and the free end of it is passed in the buckle and tightened as one would tighten a belt.

M. Loup, of Paris, presented a saliva-ejector based on the syphon principle.

M. Meng, of Paris, presented a patient on whom implantation had been performed two years previously. The tooth remains good.

Dr. Michaëls, of Paris, introduced a gold filling into the masticating surface of a large molar, using non-cohesive or soft gold. He used gold cylinders, and introduced them parallel to the sides of the cavity, allowing them to come out some distance from the orifice. The ends were then strongly condensed with a foot instrument and the leaden mallet. The operation was completed in less than a quarter of an hour, while it would have taken at least an hour with cohesive foil. He also gave a practical demonstration of his original and rapid way of making a gold plate, which has already been mentioned in the report of the oral communications.

Dr. Michaëls also presented what he calls a hand-pressure thimble. It is a clever instrument proposed to prevent fatigue and cramps in the fingers, and allows also a much greater force than can be given by the fingers. The instrument has the form of the head and neck of a swan ; the head is hollow, and so allows all the plugger handles to fit into it. The descending branch of the instrument makes a curve and terminates in a plain surface, which rests on the palm of the hand. The force used is not obtained by the fingers, but through the arm and forearm. He also presented and explained the mode of action of a new instrument, a "pad-carrier," to separate the cheeks, and at the same time close the parotid duct. With this instrument Dr. Michaëls uses colophony powder, which is dusted over the parts that are to be kept dry, and prevents the diffusion of the saliva. The instrument is of piano-wire made into an oval shape, the middle part being turned once upon itself to make a spring, while the branches are turned upon themselves and terminate in points so that cotton wool can be well retained in position. The whole instrument is pressed together and introduced into the mouth outside of the teeth; the spring action will separate the cheeks and expose the outer surfaces of the teeth.

Dr. H. A. Parr, of New York, gave a demonstration of his separators. In less than two minutes he obtained a space sufficient to work easily on two contiguous approximal cavities; the patient not complaining of any pain. He also made a gold crown and put it in place in less than an hour. The crown was made at the operating-table; the contour and tubercles were obtained without any mold being used, these last being made by simply striking once with the end of the handle of an excavator at the point where the cusp is desired. Soldering is done over an ordinary alcohol lamp. The doctor used his own "flux." The crown was a perfect success.

Dr. Poinsot, of Paris, gave a demonstration of his method of using cocaine in solution in oleo-naphthine or liquid vaseline, as described in the report of the oral communications. He also demonstrated a pair of forceps of his own device, having parallel beaks, for the extraction of lower molars.

Dr. Rauhe, of Dusseldorf, presented an automatic mallet working by air, the air being obtained by a Richardson bulb worked with the foot. The air presses on a little hammer-head, to which is affixed a movable point turning in every direction. The instrument seems to be easily employed. The inventor made three small gold fillings in less than seven minutes. He also demonstrated with a set of forceps for the extraction of deeply situated roots.

Dr. Ronnet, of Paris, made a local anesthesia with cocaine according to the ordinary method; he injected half a grain of muriate of cocaine. The patient presented unfavorable symptoms which lasted about half an hour.

Dr. Redard, of Geneva, presented a series of enameled pieces by a new process, also a new battery for use in dentistry.

Dr. Schwartz, of Nîmes, France, presented a new press for flasks, a new flask, an automatic extinguisher for the vulcanizer, and an extracting forceps with parallel beaks.

Dr. Telschow, of Berlin, presented a universal clamp for superior and inferior molars. These clamps easily keep in position. Two rings which can be thrown out on each side maintain the rubber-dam or napkin at a certain distance, leaving the operative field exposed; two little springs keep these two rings in position and prevent them from closing. Two kinds of clamps are made,—one for long-crowned molars, and the other for short crowns. He also presented a new motor for driving the dental engine by compressed air. The same can be used for drying cavities, and also for the working of a bellows for melting metals.

M. Trouvé, of Paris, gave a demonstration of the different electrical apparatus used in dental surgery.

CONCERNING THE DENTAL SECTION OF THE TENTH INTERNATIONAL MEDICAL CONGRESS.

In response to a call of the organizing committee (Professors Virchow, von Bergmann, and Waldeyer), fifty delegates from the various universities and medical societies of Germany met in Heidelberg on the 17th of September, 1888, to take steps in the organization of the congress. At the meeting it was decided that the congress should be held in Berlin, beginning August 4, and closing August 10, 1890.

An organizing committee consisting of Profs. Drs. Virchow, von Bergmann, Leyden, and Waldeyer was elected, and a general secretary, Dr. Lassar, appointed.

Eighteen sections, including dental surgery, were organized, each with a special committee of nine members.

An international medico-scientific exhibition is to be connected with the congress. Statutes and programme were adopted, which will be given in as far as they particularly concern the dental section.

Art. II. "The congress consists of physicians (approbirte Aerzte) who have registered their names and obtained their membership cards. Other savants who are interested in the work of the congress may be admitted as extraordinary members."

The delegates did not see fit to change this article so as to include dental surgeons, but decided that the article should be so interpreted as to admit dentists to membership. Since the meeting at Heidelberg the question has been raised whether dentists resident in Germany, but not possessing the German dental approbation (degree), could be admitted to membership. Regarding this point the chairman of the committee of organization decided that only those who possess the recognized degree of that country of which they are citizens may be admitted to membership.

A German citizen holding only an American or Swiss degree is therefore not entitled to membership; no more is an American or English citizen not possessing the degree of his own country. On the other hand, foreign citizens practicing in Germany are admitted without the German degree, provided they have the degree of their own country.

Members pay a fee of twenty marks, and receive a copy of the Transactions.

Art. III. The object of the congress is exclusively scientific.

Art. X. All lectures and communications in the general sittings or in those of the sections must be handed in writing to the secretary before the close of the sitting. The editorial committee decides whether, or in what part, such communications shall be included in the published Transactions.

Art. XI. The official languages of all sittings are German, English, and French. Very short remarks may be made in other languages, provided some member is prepared to translate them into one of the official languages.

Art. XII. Sections are, as a rule, to be limited to twenty minutes; discussional remarks to ten minutes.

Art. XIV. Students of medicine and other persons, gentlemen and ladies, who are not physicians but are interested in the proceedings of any particular session, may be invited by the president of that session, or on application receive permission to attend as auditors.

There are to be no vice-presidents associated with the congress, but each section is empowered to elect a limited number of honorary presidents and a secretary for each of the official languages.

The committee of the dental section is composed as follows:

Busch (Berlin), chairman; Calais (Hamburg), Hesse (Leipzig), Fricke (Kiel), Holländer (Halle), Miller (Berlin), Partsch (Breslau), Sauer (Berlin), Weil (Munich).

At a meeting of this committee held on the 16th October, 1889, it was decided that the hours from 9 to 12 A.M. should be devoted to practical demonstrations in the rooms of the dental institute, the demonstrations to consist of operations in filling, extraction, and in mechanical dentistry; in short, operations in all branches of operative and mechanical dentistry.

Demonstrations in extraction and in artificial work are to be under the direction of Prof. Busch; those in filling under that of Prof. Miller. The theoretical exercises, etc., are to be held from 2 to 5 P.M. They will consist of the usual essays or lectures and the accompanying discussions; besides these, three subjects for general discussion are to be chosen, one to be introduced in the German language (on bromide of ethyl, by Prof. Dr. Holländer), one in the English, and one in the French language.

Those desiring to deliver lectures or read essays on particular subjects are requested to send in, along with their announcement, a very short résumé of the contents of the same.

Correspondence in the German language to be directed to Prof. Dr. Busch, chairman, Dorotheen Str. 40, Berlin; in the French language to Dr. Calais, Hohenbleichen 17, Hamburg; in English to Prof. Dr. Miller, Voss Str. 32, Berlin.

In America Drs. Barrett and Taft, in Great Britain Mr. J. H. Mummery, M.R.C.S., etc., and Mr. W. Bowman Macleod, F.R.S.E., etc., have, on invitation by the committee, expressed their willingness to act in the capacity of honorary presidents.

A fuller report of the steps taken in the organization of the congress up to the end of October is given by Prof. Busch in the *Verhandlungen der deutschen odontologischen Gesellschaft*, Heft 2.

W. D. MILLER.

VERMONT STATE DENTAL SOCIETY.

THE fourteenth annual meeting of the Vermont State Dental Society will be held at Bellows Falls, commencing on the third Wednesday in March (19th), 1890, and continuing three days. Members of the profession are cordially invited to attend.

THOS. MOUND, *Secretary*, Rutland, Vt.

A CONFERENCE INVITED.

AT the nineteenth semi-annual meeting of the New Jersey State Dental Society, held at the office of Dr. S. C. G. Watkins, Montclair, N. J., Saturday, January 11, the following resolution was passed:

> Deeming it fitting, and the proper time for holding an International Dental Congress in the year 1892, the New Jersey State Dental Society has appointed a committee to act in co-operation with like committees from all other dental societies throughout the United States. They request each society to appoint a committee to meet with them at the Hoffman House, New York, on Tuesday afternoon, April 8, to formulate plans for the holding of the First International Dental Congress.

We trust that this will meet with the approval of all dental societies, and that their executive committees will appoint delegates at once.

S. C. G. WATKINS, *President.*
CHARLES A. MEEKER, *Secretary.*

COMMENCEMENT—BALTIMORE COLLEGE.

THE fiftieth commencement of the Baltimore College of Dental Surgery will be held on Thursday, March 20, 1890. All graduates and friends of the college are invited to be present.

B. HOLLY SMITH.

MEETING OF THE AMERICAN DENTAL ASSOCIATION.

CHICAGO, February 14, 1890.

EDITOR DENTAL COSMOS:

I inclose copy of vote taken in regard to changing the time of meeting of the American Dental Association, forwarded me by the corresponding secretary. According to that vote the meeting will be held at the usual time. Railroad and other arrangements will be made as soon as possible. If those expecting to attend would notify the chairman of the executive committee of their intention it would enable us to make our arrangements more definitely.

We hope a large enough number will go by way of Chicago to warrant us in securing a special train to Excelsior Springs.

Further information will be furnished later.

J. N. CROUSE, *Chairman Executive Committee.*

Ballot on changing time for meeting of the American Dental Association resulted as follows: eleven (11), no change; one (1), change; two (2), either or with the majority; one (1), not heard from.

FRED. A. LEVY, *Corresponding Secretary.*

EDITORIAL.

THE FUTURE OF DENTAL LITERATURE.

IN a recent issue of a contemporary dental journal the opinion was editorially expressed that "the profession is largely written out." We should be very sorry to accept this conclusion,—very sorry to have the profession accept it. A general concurrence in that idea would be detrimental to the last degree.

It is true that in the handicraft of dentistry very satisfactory attainments have been reached and gratifying results secured,—triumphs of mechanical skill, of manipulative ability,—yet neither operative nor prosthetic dentistry has reached the *Ultima Thule* of practical development, and until they shall have done so the books cannot be closed and the official notice posted up, "Written out." These departments belong to the practical side of dentistry, which it is sometimes claimed has been developed to the neglect of the scientific certitudes which ought to underlie practice. There are many problems remaining to be solved.

It is also true that in dental pathology and therapeutics, in the diagnosis, prognosis, and treatment of abnormal conditions, great progress has been made in the last two decades; yet who will claim that the end has been reached?

It is true that much good work has been done in the study of the etiology of caries and of irregularities, but there is room for still further investigation, still further advances.

There are, besides, fields almost wholly untilled which invite scientific labor and research and promise valuable results.

In the hope of interesting some who may be debating as to the special direction in which they may work with pleasure and profit to themselves and for the benefit of the profession and of humanity, we suggest that fruitful inquiry might be made in any of the following lines:

The correlation of systemic and mental with dental development.

That there exists a correlation is not to be disputed; its extent and significance are yet to be determined. There are probably in the characteristics of the dental organs indications as to whether imbecility in a child is the result of intra-uterine influences or of subsequent causes. The determination of this question would furnish data for diagnosis and prognosis of great importance in many cases.

The relation of diathesis to the physical characteristics of the teeth, maxillæ, and palate.

Whether there are in the character of the teeth, their alignment, etc., any pathognomonic indications of hereditary gout, rheumatism, tuberculosis, scrofulosis, cancer, etc., is a problem worthy of investigation.

The distinguishing registration on the teeth by the eruptive fevers or other infantile diseases.

That the interruption of nutrition caused by infantile diseases is recorded in the dental organs there is no question. Are the records of the various derangements distinguishable? Can those made by the eruptive fevers or by mercury be surely discriminated from those resulting from syphilis?

The influence of cachexiæ in the causation of caries.

Pathological systemic conditions find usually a more or less strongly pronounced expression in the mouth. It is reasonable to think that the effects vary with the varying cachexiæ. Are there distinguishable differences? If so, what are they?

The laws of correlation in their application to the restoration of lost dentures in harmony with the physical organization.

Prosthetic dentistry is yet far from being an exact science. The ability to meet in each individual case the demands of the law of correspondence can be obtained only by a better comprehension of the law itself.

Normal and abnormal eruption of the deciduous and permanent teeth.

This subject has not received from dentists the attention to which it is entitled. The relations of race, country, climate, civilization, and food to dental evolution are worthy of systematic attention, and should include data concerning time and order of eruption, irregularities of sequence, abnormalities of arrangement, undue or diminished size of certain teeth, structural peculiarities such as stunted growth, want of continuity of enamel, etc. Such records should include as well observations of the palate, whether narrow and vaulting or unusually broad and flat, hanging palate, cleft palate, relative size of the superior and inferior maxillæ, etc.

The influence of intermarriage upon the dentures of the progeny.

The concurrent testimony of various observers upon this point would be a valuable contribution to other records concerning the physical and mental results of consanguineous generation.

The peculiarities of the maxillæ and teeth in children relatively to those of the parents in the marriage of those of differing nationalities, differing or similar temperaments, and other physical characteristics, such as height, weight, and relative age of parents.

Relevant data would be interesting and useful.

The modifications of the salivary and mucous secretions by various diseases and influences.

That the products of the mucous and salivary glands vary in different systemic conditions in character and in their effects upon tooth-structures, as well as upon the soft tissues of the mouth, has been generally recognized, but the specific alterations and varying effects under changed conditions should be more closely observed than they appear to have been.

Systemic derangements manifested in the mouth.

The influences of malaria, gout, rheumatism, hysteria, mechanical injury to or morbid growth in a nerve-center or in the brain, the sympathy of contiguity or neuralgic radiation in diseases of the eye or ear, should be carefully studied and the details recorded, thus helping others to accuracy of diagnosis and prognosis and to perception of the therapeutic, surgical, or mechanical indications.

Systemic disturbances due to causes existing in the oral cavity.

The systemic inharmonies induced by peridental inflammation, by exostosis of the roots of teeth or by the exposure or death of their pulps ; the direct or sympathetic relations of the teeth with the entire physical economy ; the relations of contiguity with the eyes, ears, nares, and the antra of Highmore, are surely worthy of more systematic observation and record than has yet been given.

The character of the decay to which the different varieties of teeth are liable by virtue of their original structure.

This is a consideration which should always be taken into account when the methods of treatment are discussed,—whether to file or fill, how and with what.

The modifications in the tendency to and of the character of the decay at puberty, during gestation and lactation, and at the climacteric.

At these periods sympathetic constitutional disturbances are usually present, "new balances are struck," functional and organic changes take place, digestion and assimilation are more or less modified, with consequent modifications of the mucous and salivary secretions involving liability to injurious action upon tooth-substance. Nutritive changes at these periods exert also marked influence in the promotion or retardation of caries.

The causes of variation in the crowns and roots of teeth.

Anatomical variations in the crowns and roots of teeth expressing perverted function, reversionary tendency, or mechanical interference are interesting subjects of study in the individual subject and from the stand-point of heredity.

The etiology of dental irregularities.

This subject has recently received considerable attention, but merits more profound study and research.

The influence of oral respiration on the positions of the teeth and on the health of the mouth.

The influence of the tongue over the positions of the lower teeth.

These subjects are worthy of special study as factors in the causation of irregularities.

The relation between dental caries and diet.

Although much has been written on this subject, we have scarcely any data which may properly be called scientific.

On the distribution of dental caries.

Every dentist should keep an accurate record of the localization of caries, and these individual observations should be collated and published.

On the relation between race and tooth-form.

If this subject were properly worked up, we would probably have one of the best guides to identification of race.

The value of the teeth in speech, especially the influence they exert in lisping, stuttering, singing, etc.

Until all the various offices of the teeth are fully comprehended their value will not be fully appreciated. With more knowledge, not only the profession but the public will come to regard the loss of a tooth as a real misfortune, its unnecessary extraction a crime.

The significance of the variations in the rugæ.

A paper entitled "The Palatal Rugæ in Man" was read by Dr. Harrison Allen before the Academy of Natural Sciences, and published in the DENTAL COSMOS for January, 1889. In this paper, well worthy the study of every dentist of scientific proclivities, the author propounds and endeavors to answer the following queries: What variations from the type met with in the lower animals are seen in man? How do these variations in him associate themselves with morbid states? With what structures do these variations correlate? What forces are at work to produce in man results so different from those seen in the animals related to him?

Do retrograde variations in the density of tooth-structure—either enamel or dentine—occur after full eruption of the tooth by virtue of alterations in the nutritive processes induced by pregnancy, neurasthenic conditions, cachexiæ, etc.?

That there is a progressive structural change in the teeth after eruption, that at first they do not have the compactness and hardness which subsequently characterize them, is not questioned, but it is not so generally admitted that variations in density are consequent upon modifications in systemic conditions.

The molecular structure and chemical properties of amalgams and amalgam alloys.

The domain of dental chemistry offers a tempting and fruitful field for experimental research. Though comparatively little has been done in this direction, the results so far obtained have been in a high degree important and valuable.

The molecular structure and composition of plastic materials for fillings.

A full knowledge of the relations and effects of the constituents of amalgam alloys and cements, as to kind, number, and quantity, would result in the production of better compounds for the purpose, and place the manufacture upon a scientific basis instead of the commonly empirical one upon which it now rests.

The ideal plastic should be soon forthcoming, in view of the advances made by chemical science in other lines of technology.

These suggestions and queries presuppose an increasing ability, inclination, and facility for the scientific prosecution of investigations on the part of dentists which shall command for dentistry as a clearly defined profession or specialty of medicine the recognition and respect of the scientific world.

The concurrent or conflicting testimony of various observers is needed as to each problem, and the correlation of what appear to be facts in order that intelligent deductions may be made and satisfactory conclusions reached.

So far from dentistry being written out, we are but just beginning to realize the complexity and the significance of the problems awaiting solution. The investigation of such topics by each of a score of workers will change the estimate of the public, widen the purpose of instruction, and enlarge the field of labor. Having more to do, the teacher will do more; and doing more, will not only become more himself but will help the student to do and to be more.

To do more and be more, or to do less and be less, is compulsory; a forward movement or retrogression is inevitable. "All things retrograde which do not advance" is an axiom which applies alike to the college, the periodical, the society, and to the individual.

THE QUESTION OF AN INTERNATIONAL DENTAL CONGRESS.

THERE appears in this issue of the DENTAL COSMOS a circular letter from the New Jersey State Dental Association inviting dental societies throughout the United States to send representatives to a meeting in New York, April 8, for the purpose of formulating plans for the holding of the First International Dental Congress.

As the first International Dental Congress was held in Paris in September last, the question of *priority* may hardly be raised.

We have already editorially urged the propriety and advisability of a memorial meeting of the American Dental Association in 1892. A national association would seem to be the proper body for the organization and conduct of a celebration distinctively professional and cosmopolitan, and the date 1892 an auspicious time, if the project for a general commemoration of the discovery of America be carried out in that year.

At such a meeting the question of organizing an International Dental Congress,—a separate and distinct body,—to convene at stated intervals in the future, would be a fitting subject for free and full discussion by the representatives of the several countries whose sympathy and co-operation would be necessary to the formation and perpetuation of a truly international congress.

The coming session of the International Medical Congress, with its dental section, at Berlin, will afford another opportunity for an interchange of opinion regarding the antagonistic propositions of co-operation of dentists as specialists with the medical congress or a distinct and purely dental organization. One plan or the other will necessarily have to be abandoned. It would be impracticable to profitably continue both.

It seems premature to attempt at the present time the organization of an International Dental Congress, in view of the lack of unanimity among the dentists of the United States as to which method offers the greater advantages, and not only without the concurrence of the dentists of other countries, but in contravention of very decided expressions as to the unwisdom of immediate action in the premises.

It is important that so serious a problem as the abandonment of the dental section in the Medical Congress for the purpose of a separate organization should not be decided upon without the approval of a clear majority of those desirous of maintaining an international intercourse of a professional character, and who have contributed by their presence and otherwise to the success of the dental section of the Medical Congress. We do not oppose the fullest consideration of the subject, but it seems unwise for the dentists of one nationality to expect concurrence without consultation with the party of the other part. It is an ancient axiom that it takes two to make a bargain; sometimes, as in this case, we assume that it will take more than two. Certainly the dentists of every country which has been represented in the dental section of the Medical Congress should have a voice in the settlement of the question.

ANESTHESIA BY CHLOROFORM.

WE publish in the Periscopic department of this issue the so-called "practical conclusions" of the second Hyderabad Chloroform Commission, and as their deductions will doubtless and very properly be frequently referred to and will be considered as establishing the claim that anesthesia by chloroform is not necessarily dangerous to life, with proper precautions, we reproduce here the statements regarding it in the last edition of Wood's "Therapeutics,"—statements which are also entitled to great weight. He says,—

"As an anesthetic chloroform possesses the advantages of quickness and pleasantness of operation, smallness of dose, and cheapness. These advantages are, however, so outbalanced by the dangers which attend its use that its employment under ordinary circumstances is unjustifiable. It kills without warning so suddenly that no forethought or skill can guard against the fatal result. It kills alike the robust and the weak, the well and the diseased; even the previous safe passage through one or more inhalations is no guarantee against its lethal action. Statistics seem to indicate a mortality of about one in three thousand inhalations, and hundreds of utterly unnecessary deaths have been produced by the extraordinary persistence in its use of a portion of the profession. It ought never to be employed except under special circumstances, as when a speedy action is desired in puerperal eclampsia, or when the more bulky anesthetics cannot be transported, as in the field at war time."

BIBLIOGRAPHICAL.

THE NATIONAL MEDICAL DICTIONARY: Including English, French, German, Italian, and Latin Technical Terms used in Medicine and the Collateral Sciences, and a series of Tables of Useful Data. By JOHN S. BILLINGS, A.M., M.D., LL.D. Edin. and Harv., D.C.L. Oxon., Member of the National Academy of Sciences, Surgeon U.S.A., etc., with the collaboration of eleven prominent physicians. 2 vols., large octavo, 731 and 799 pp. Philadelphia: Lea Brothers & Co., 1890. Price, cloth, $6.00; leather, $7.00; half morocco, marbled edges, $8.50 per volume. For sale by subscription only.

The object of this dictionary, as we are informed in the preface, is "to furnish to students and practitioners of medicine a clear, concise definition of every medical term in current use in English, French, German, and Italian medical literature, including the Latin medical terminology of all these languages." The synonyms in French, German, and Italian of important words in English and Latin are given, and the pronunciation indicated either by an accentuated syllable or by phonetic spelling, and for most English and Latin words the derivation is given. The total number of words and phrases defined is 84,844. A series of tables containing much valuable information is prefixed to the first volume.

The learning, the labor, the patience, the fidelity shown in the preparation of these two magnificent volumes must excite the admiration of every one competent to form an intelligent opinion thereon. The ambition which inspired the effort did not exceed the ability displayed throughout the work, and the Herculean task was completed with no evidences of a failure in the energy with which it was begun.

The publishers have brought out the work in a style worthy of the contents, and no higher praise could be given. The "National Medical Dictionary" will be not only an invaluable addition, but an ornament to any library in the world.

ARTIFICIAL ANÆSTHESIA: A Manual of Anæsthetic Agents and their Employment in the Treatment of Disease. By LAURENCE TURNBULL, M.D., Ph.G. Third edition. Revised and enlarged. With illustrations. Large 12mo, 521 pp. and index. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $3.00.

That a third edition of this book should have been called for within six months after the issue of the second is evidence of the appreciation of the profession. The author has made a thorough revision of the whole subject of artificial anesthesia, local and general. This edition of his book is considerably increased in size by the additions found necessary to include the latest information concerning anesthetic agents, and is without doubt the most complete manual of the subject extant. Dr. Turnbull has positive opinions, based on large experience, as to the relative safety in various operations of the different agents employed, and presents an intelligent and intelligible description of their natural and physiological characteristics and peculiarities, and of the methods of treatment to be employed in the event of untoward symptoms presenting. So far from considering that anyone of the anesthetics is free from risk to life, he gives serious caution against the careless or ignorant administration of these beneficent yet death-dealing agents; considers that their indiscriminate employment is the crying evil of the present day, and recommends legislative action to prevent under heavy penalty anyone from giving an anesthetic unless able to show that he or she is fully qualified by knowledge and experience.

A MANUAL OF DENTAL ANATOMY, Human and Comparative. By CHARLES S. TOMES, M.A., F.R.S., with 212 illustrations. Third edition. Large 12mo, 484 pp. and index. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $4.00.

The first and second editions of this book, issued in 1876 and 1882, were noticed in the DENTAL COSMOS at the time of their issue,—the first at considerable length.

In the present edition the author has availed himself of the various treatises on odontology, and expresses obligation to Professors Owen, Giebel, Flower, Dr. Wortman, and to Professors Cope and Marsh. The book is doubtless, though denominated an elementary text-book, the most complete presentation of the important facts of human and comparative dental anatomy extant. As the subjects of the typical mammalian dentition, evolution, and inherited variation, and their relations to the etiology of irregularities, are attracting much attention at this time, and their comprehension is so important in the scientific study of cases in practice, we cannot do better than advise every dentist interested in these studies to familiarize himself with Professor Tomes's latest labors in this direction.

OBITUARY.

DR. URIAH B. KIRK.

DIED, at Philadelphia, January 9, 1890, of heart-failure, DR. URIAH B. KIRK, in the sixty-ninth year of his age.

Dr. Kirk was born in Montgomery County, Md., August 22, 1821. He was taught mechanical dentistry in the laboratory of Dr. Edward Townsend. He commenced the practice of dentistry with his brother, Mahlon Kirk, in Philadelphia, in 1855, and continued to practice in this city until the close of his life.

Dr. Kirk was one of the few remaining thoroughly competent artist workmen in prosthetic dentistry, and maintained his high standard of work to the last. He was a genial, conscientious gentleman, and was esteemed for his many good qualities by a large circle of professional friends.

PERISCOPE.

Report of the Second Hyderabad Chloroform Commission.—Two commissions to examine into the alleged dangers of chloroform have been appointed by the Nizam's government,—the first in 1888. The second report is dated at Hyderabad, December 18, 1889, and is signed by Edward Lawrie, T. Lauder Brunton, G. Bomford, and Rustomji D. Hakim. The commission owes its existence to Surgeon-Major Lawrie's veneration for his late teacher, Professor Syme, and his desire to prove the correctness of Syme's teaching that chloroform might be administered with perfect safety provided the administrator watched the respiration with sufficient care. The conclusion of the first commission was that chloroform always arrests the respiration before it arrests the action of the heart. The facts brought forward were deemed by many insufficient to overthrow the conclusions of other observers both in this country and abroad whose researches seemed to prove that one of the dangers from chloroform was paralysis of the heart. The outcome of the work of the second commission would appear to be that deaths from chloroform may by due care in its administration be certainly avoided. We make the above brief summary from an editorial in the London *Lancet* of January 18, in which the writer claims that the conclusions of the commission are sweeping, and cannot be accepted without abundant evidence to support them. The report itself, occupying over twenty columns in fine type of the *Lancet*, concludes with the following practical deductions, which deserve the careful study of every one who proposes to administer chloroform as an anesthetic :

I. The recumbent position on the back and absolute freedom of respiration are essential.

II. If during an operation the recumbent position on the back cannot, from any cause, be maintained during chloroform administration, the utmost attention to the respiration is necessary to prevent asphyxia or an overdose. If there is any doubt whatever about the state of respiration, the patient should be at once restored to the recumbent position on the back.

III. To insure absolute freedom of respiration, tight clothing of every kind, either on the neck, chest, or abdomen, is to be strictly avoided ; and no assistants or bystanders should be allowed to exert pressure on any part of the patient's thorax or abdomen, even though the patient be struggling violently. If struggling does occur, it is always possible to hold the patient down by pressure on the shoulders, pelvis, or legs without doing anything which can by any possibility interfere with the free movements of respiration.

IV. An apparatus is not essential, and ought not to be used, as, being made to fit the face, it must tend to produce a certain amount of asphyxia. Moreover, it is apt to take up part of the attention which is required elsewhere. In short, no matter how it is made, it introduces an element of danger into the administration. A convenient form of inhaler is an open cone or cap with a little absorbent cotton inside at the apex.

V. At the commencement of inhalation care should be taken, by not holding the cap too close over the mouth and nose, to avoid exciting, struggling, or holding the breath. If struggling or holding the breath do occur, great care is necessary to avoid an overdose during the deep inspirations which follow. When quiet breathing is insured as the patient begins to go over, there is no reason why the inhaler should not be applied close to the face ; and all that is then necessary is to watch the cornea and to see that respiration is not interfered with.

VI. In children, crying insures free admission of chloroform into the lungs ; but as struggling and holding the breath can hardly be avoided, and one or two whiffs of chloroform may be sufficient to produce complete insensibility, they should always be allowed to inhale a little fresh air during the first deep inspirations which follow. In any struggling persons, but especially in children, it is essential to remove the inhaler after the first or second deep inspiration, as enough chloroform may have been inhaled to produce deep anesthesia, and this may only appear, or may deepen, after the chloroform is stopped. Struggling is best avoided in adults by making them blow out hard after each inspiration during the inhalation.

VII. The patient is, as a rule, anesthetized and ready for the operation to be commenced when unconscious winking is no longer produced by touching the surface of the eye with the tip of the finger. The anesthetic should never under any circumstances be pushed till the respiration stops ; but when once the cornea is insensitive, the patient should be kept gently under by occasional inhalations, and not be allowed to come out and renew the stage of struggling and resistance.

VIII. As a rule, no operation should be commenced until the patient is fully under the influence of the anesthetic, so as to avoid all chance of death from surgical shock or fright.

IX. The administrator should be guided as to the effect entirely by the respiration. His only object, while producing anesthesia, is to see that the respiration is not interfered with.

X. If possible, the patient's chest and abdomen should be exposed during chloroform inhalation, so that the respiratory movements can be seen by the administrator. If anything interferes with the respiration in any way, however slightly, even if this occurs at the very commencement of the administration, if breath is held, or if there is stertor, the inhalation should be stopped until the breathing is natural again. This may sometimes create delay and inconvenience with inexperienced administrators, but experience will make any administrator so familiar with the respiratory functions under chloroform that he will in a short time know almost by intuition whether anything is going wrong, and be able to put it right without delay before any danger arises.

XI. If the breathing becomes embarrassed, the lower jaw should be pulled, or pushed from behind the angles, forward, so that the lower teeth protrude in front of the upper. This raises the epiglottis and frees the larynx. At the same time it is well to assist the respiration artificially until the embarrassment passes off.

XII. If by any accident the respiration stops, artificial respiration should be commenced at once, while an assistant lowers the head and draws forward the tongue with catch-forceps, by Howard's method, assisted by compression and relaxation of the thoracic walls. Artificial respiration should be continued until there is no doubt whatever that natural respiration is completely re-established.

XIII. A small dose of morphia may be injected subcutaneously before chloroform inhalation, as it helps to keep the patient in a state of anesthesia in prolonged operations. There is nothing to show that atropine does any good in connection with the administration of chloroform, and it may do a very great deal of harm.

XIV. Alcohol may be given with advantage before operations under chloroform, provided it does not cause excitement, and merely has the effect of giving a patient confidence and steadying the circulation.

The commission has no doubt whatever that, if the above rules be followed, chloroform may be given in any case requiring an operation with perfect ease and absolute safety so as to do good without the risk of evil.

HINTS AND QUERIES.

COMBINED ZINC-PHOSPHATE AND ALLOY.—The subject of "Zinc-Phosphate and Alloy Filings Mixed, as a Filling-Material," presented to the New York Odontological Society by Dr. C. B. Parker, and appearing in the DENTAL COSMOS for January, is one which I am convinced is of far greater importance than many will at first believe. In the COSMOS for August, 1888, there is a synopsis of a paper I presented to the Florida State Dental Association touching upon cement linings, followed by both alloy and gold fillings. Since then I have made very extended experiments with a combination of cement and alloy, and am more than ever convinced that very important improvements in plastic fillings are possible by properly combining these materials. My object in this communication is to help to keep the matter before the profession until thorough investigation shall be had and the best methods worked out. My practice has been to prepare the alloy and cement, each in the usual way, and to place the cement in the cavity first, following with the alloy while the cement was plastic and sticky and extended to the immediate edge of the cavity, so that in large cavities a portion of both materials was mixed, but the surface had only alloy exposed. Where this partial mixing occurred I do not recollect in five years' experience with this method an instance in which the alloy and cement separated, though I have filled teeth with the combination that I would not have considered worth filling with either material alone. I thus often subjected the line of union to very great strain, which showed that there is a union of a nature which is of great practical importance. I am positive that no method of filling teeth that has been of general practice will compare with this method for permanence in weak teeth, excepting gold with cement lining, executed in the best manner. With gold, of course, the cement is allowed to set before the gold is attached, by retaining-points. With linings of cement of a good, strong quality shells of teeth can be filled and will retain their color, or not discolor during an indefinite time. It is a method requiring some skill, but when performed just right will preserve teeth that with other methods would be unsightly, expensive, and often impracticable. The cement strengthens the weak parts, prevents leakage, and improves anchorage to a wonderful degree. Except in small cavities where the strongest pressure in condensing and burnishing over bibulous paper is attainable, I do not use alloy any more without first lining with cement. I have no doubt a great and valuable change in general practice will soon follow on this line.—W. E. DRISCOLL, Manatee, Fla.

ROOT-FILLING.—In the January DENTAL COSMOS, from page 40 to page 58, the subject of root-filling is pretty extensively discussed, but there seems to have been no agreement as to the material best suited for the purpose. I have experimented with almost every material recommended, with teeth in their natural sockets and teeth that had been extracted, and never obtained entire satisfaction with any until a year or two since, when I conceived the idea of using beeswax, and my experience and success so far are entirely satisfactory. Nothing better than beeswax can be desired, and I doubt if any better material for root-filling and pulp-capping will ever be produced. Drawn temper canal-pluggers are effective in its introduction into nerve-canals. The size of the canal will indicate the size of the instrument, which should be frequently heated over a spirit flame during the introduction of the wax.

For capping over pulps nearly exposed, I simply cover the base of the cavity thoroughly with wax, then with a warmed cap of lead, tin, or gutta-percha as may be indicated, and fill with gold or amalgam as judgment may direct.—B. F. ARRINGTON.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—May we ask the favor of a few lines in the way of a correction of a statement appearing in the DENTAL COSMOS for February in the course of a paper read by Dr. L. D. Shepard before the First District Dental Society of New York? The incident related by him of two young men holding the British degree of L.D.S. referred doubtless to ourselves, which fact would be readily recognized by our friends at home. We did call on Dr. Shepard and explained to him that our main object in coming to this country was for the purpose of obtaining increased experience in American methods, especially in operative dentistry. While of course we would naturally desire to obtain a diploma, that was a secondary consideration. Had it been our main object we would have chosen a college whose course was only five months instead of seven. Again, as Dr. Shepard knows, the diploma of the school we selected is not recognized in our country, while that of Harvard is.

The point we wish to emphasize is that whether we were correct in our selection of a school or not, we were influenced to the decision solely by the conviction that we would find larger opportunities there for the instruction which we desired, and not in order to gain a few weeks' time. We inclose our cards Respectfully, A. K. F. and L. S. S.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

ACTION OF THE PEROXIDE OF HYDROGEN UPON THE TEETH.

BY W. D. MILLER, PH.D., D.D.S., BERLIN.

W. H. ROLLINS,* after calling attention to the fact that the enamel of the teeth loses its polish under the action of peroxide of hydrogen, reports upon an experiment which at first appears to indicate that this agent, for some years extensively used in the human mouth, may have an effect upon the teeth far more injurious than any that has ever been ascribed to salicylic acid even by its most zealous opponents.

Rollins placed a freshly-extracted tooth in an ounce of peroxide of hydrogen (strength not given) obtained from a thoroughly reliable apothecary, and found that after four hours the enamel had completely lost its polish, and that in the remarkably short time of two days the whole tooth had become so soft that it could be bent between the fingers. He uses a solution of peroxide of hydrogen for decalcifying teeth of which he wishes to make cuts.

A decalcifying action as intense as that indicated by the above experiment would unfit any agent for use in the mouth. Unfortunately, in the account I have seen nothing is said of the reaction of the solution made use of, and I very strongly suspect that it was decidedly acid. There are here in use two different preparations of peroxide of hydrogen, the medicinal and the technical; the latter of these usually has a strong acid reaction. A sample which I recently examined contained 0.3 per cent. of hydrochloric acid.

It would naturally be well for every practitioner who makes use of the peroxide to demand a preparation free from acid, or one in which the acid reaction is so slight as to be of no consequence; or if

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the solution, on testing with litmus paper, is found to have an acid reaction, it should be neutralized and filtered before using.

In the following I wish to call attention to an action of the peroxide of hydrogen upon teeth out of the mouth, which is directly the reverse of that observed by Rollins. In a lecture on the peroxide of hydrogen delivered by Busch before the Odontological Society of Germany, the lecturer presented three glass vessels for inspection, the first of which contained a number of sound teeth, the second a cross-section of an elephant's tusk, the third a section of a walrus tooth, all in 10 per cent. solutions of the technical peroxide of hydrogen.

The reaction of the solutions was neutral or but slightly acid. The bottom of all the vessels was covered with a fine white powder, while the liquid was clouded by a precipitate of a more flocculent nature.

An examination of the teeth which had been lying in the solution for six weeks showed that the enamel had not been very seriously affected ; it had lost its polish, and on drying was found at some points to have become superficially opaque and chalky.

The action upon the roots was much more pronounced. They were softened to a depth of about one-half millimeter (at the apices still more), and could be readily cut with a knife. The softening was not, however, of the nature of a decalcification ; the roots were not cartilaginous, as when softened by acids, but rather chalky, cutting very much like soapstone, suggesting the thought that the organic constituents which hold together the lime-salts have been destroyed.

The powder covering the bottom of the vessel was readily soluble in acids with a slight residue, and was found to consist of 14.7 per cent. organic matter and 85.3 per cent. inorganic matter (lime-salts). The flocculent precipitate above mentioned consisted of glutin which had been dissolved and was subsequently precipitated by the gradual change in the reaction of the solution.

The effect upon the section of ivory which had laid for six months in the solution was very remarkable. On attempting to remove it from the vessel it fell into "a thousand pieces," very much like a piece of charred paper. Small pieces of it placed in solutions of various acids, mineral and vegetable, were speedily dissolved, leaving a very delicate, fragile, and transparent residuum. The other pieces, on being dried, were rubbed up into a powder with the greatest ease.

The analysis gave 10.65 per cent. organic matter, instead of 38 per cent., which I found in normal ivory.

The solvent action of the peroxide of hydrogen upon the basis-substance of dentine may be further illustrated by the following experiment : A cross-section of the tooth of a whale (Catodon) after being decalcified was brought into 10.0 ccm. of a 10 per cent. solution of technical peroxide. In twenty days the greater part of the section had been dissolved ; the solution gave a dense precipitate on addition of a drop of tannic acid.

The result seems to leave no room for doubt that neutral or nearly neutral solutions of peroxide of hydrogen act upon dentine by destroying or dissolving the organic matter by which the lime-salts are liberated or their bond of union destroyed. At all events the agent in question should be used with some caution, and when applied repeatedly, or when used as a mouth-wash, as suggested by Busch, the necks of the teeth should be particularly watched and the use discontinued in case the disintegration begins to show itself.

These observations have a certain interest from another point of view, inasmuch as they show us what we should have to expect in case decay of the teeth resulted from a destruction of the organic matter by bacteria, thus permitting the lime-salts to fall apart, as was formerly maintained by some authors. If such were the case, the decaying dentine would be reduced to a chalky, friable mass, which might be readily pulverized in a mortar, and not to the tough, cartilaginous mass which we actually find.

NOTE.—A still more intense action was produced upon teeth by keeping them for some weeks in a 5 to 10 per cent. solution of caustic potash. The ends of the roots could be crushed between the fingers and easily cut with a knife. They were not decalcified, but disintegrated. If decayed teeth are placed in the same solution, the decayed dentine will in the course of time be completely dissolved, a fact to which my attention was first called by Prof. Busch. The question arises in this connection whether there may not be other substances in the human mouth under certain conditions which, in the course of years, may in a similar manner dissolve out the organic basis-substance of the teeth, leaving the friable tissue to be worn away mechanically. Attempts to account for erosion by the action of decalcifying agents have thus far not led to a satisfactory solution of the question, and it might be well in future while searching for the cause of erosion to bear in mind that the teeth may be acted upon by agents which attack primarily the organic as well as by those which attack only the inorganic constituents.

THEORY AND PRACTICE IN THE TREATMENT OF PROXIMATE SURFACES.

BY DR. GEORGE S. ALLAN, NEW YORK CITY.

(Read before the Anniversary Meeting of the First District Dental Society, State of New York, January 15, 1890.)

ANYONE who will take the time and trouble to look through the literature of the subject of this evening's paper will be much impressed with the thought that one idea in reference to it is dominant everywhere, that most writers agree in giving it the precedence over all others. There is a remarkable unanimity prevailing in their writings, and an equally remarkable singleness of purpose in the force, power, and ingenuity of the many arguments and reasons they give why this idea should be the all-prevailing one, and that all other ideas and principles are erroneous in theory and hurtful in practice. No student depending on our literature only for a correct guide would for a moment hesitate as to the course he should pursue or have any doubts as to the manner in which the highest success was attainable. It might seem strange in noting the efforts made to strengthen this theory that what may be called the opposing theory was practically without defenders, and so a spirit of inquiry and investigation would be aroused and set in motion.

In looking around he would be greatly puzzled at discovering, almost at the start, that the system which no writer defended was strongly intrenched and was protected by the great body of the profession, was in good fellowship with them, was their friend and companion in many a hard day's practice, and that they were not at all disposed to part company with it or to listen patiently when it was maligned.

But let us have names or definitions to start with. This dominant idea or principle I have alluded to in the treatment of proximate faces of teeth consists in the full restoration of the shape of the decayed tooth by the filling-material employed, and it is all embodied in the expression "contour fillings." Anything that is not a contour filling falls into the ranks of the opposition, and as good a name as any to give these would probably be "face fillings." As ordinarily used, these expressions apply to gold fillings, and we will here adopt the common acceptation of the terms.

The intent of my paper this evening will be simply this: To compare the two methods to see wherein they differ, and why they differ; and, if possible, to so place the subject before you that you will acquit me in the end of bias or prejudice, and credit me with having made an honest effort to help you see the subject fairly and to judge it on its merits only.

The title of my paper is "Theory and Practice in the Treatment of Proximate Surfaces," and my reason for choosing this title was simply this: The theory and practice differ widely. The bulk of the practice of the day is in the direction of face fillings. The theory of the day is contour fillings. Now, what is the reason of this strange contradiction, and what should we learn from it? Either the theory is not so perfect as its many able supporters would have us believe, or busy practitioners ignore it.

My first duty will be to examine the theory somewhat closely and to point out some of its many weak spots, and to show how common sense and natural law have both been defied in order to perfect the beautiful ideal. High ideals are indeed valuable, and the more of them we have and the more constantly we keep them before us and follow their lead the better for us ; but good judgment must guide and direct our actions, and even high ideals must at times give way when reasoning and sound thought, or even cold policy, point the road to follow. If there is one thought more powerful than any other that has tempted me to undertake the task of writing this paper, it is that I may have the opportunity to enter my strong protest against the wholesale condemnation that the great body of the profession lies under for daring to continue the practice and to uphold the tenets of face fillings. I do not believe that the many able men in our profession who practice face fillings are wholly wrong, weak, or vicious in their practice. They have a reason for the faith that is in them, and are honest and conscientious in their daily professional life, and the sum of the services they render their patients compares most favorably with those who claim to practice according to the higher law.

Opinions based on personal experience are apt to be very positive and fixed, and cannot be changed without great effort ; and they carry great weight in an argument on the merits or demerits of such a system as we are considering.

My good friend, Dr. S. G. Perry, has probably given us one of the best papers extant on the subject of the treatment of proximate faces, and I am glad to say I have read it and re-read it with both pleasure and profit. It is a masterly treatment of the subject, and by a well-recognized leader in our profession ; but each time as I read it it seems to me top-heavy, and that he proves too much. Now, the doctor, in order to add weight to his arguments, gives us some of his personal experience. This he does most kindly and with a sacrifice of feeling most commendable. I confess to a good deal of hesitation in following his lead in this direction, for it is not pleasant to open one's mouth for public inspection or criticism ; still, for the sake of truth, I will swallow my scruples and do as he has done.

About the same time that he was having the fine work done in his mouth that he alludes to in such glowing terms, I was under the hands of Dr. Varney, and I will tell you my story in the same spirit that he tells his. First, I would say that no one holds in higher respect the memory of Dr. Varney than I do, or more kindly and thoroughly appreciated his fine technique and ability. He combined in a rare degree fine mechanical skill with honesty and conscientiousness, and few of us can hope to leave a record so full of value to the profession. I am glad that I knew him as I did, and was so well acquainted with his methods and principles in practice.

For a few years I had great comfort with the work; then came trouble. One tooth, which it had taken him between three and four hours to fill, to say nothing about the time spent in excavating and applying the rubber, had to be opened and the dead pulp removed; this was done by Dr. Varney himself. Later on the buccal wall gave way, and now that loss has been made good with an amalgam filling. The loss of the pulp and subsequent inflammations, as also the breakage, can be attributed only to the undue force and hammering the unfortunate tooth received. Its opposing tooth decayed around the filling badly and was patched with soft gold by Dr. Dunning, and the contour, to my satisfaction, mostly filed away. I say to my satisfaction, because I felt that decay was going on, and that too in places where it could not be easily reached. In no way has that tooth or the space troubled me since Dr. Dunning finished it. One other tooth that Dr. Varney filled came to grief,—breaking down; and now the root carries a crown. Other contour work done for me by men of equal ability has fared but little better.

As Dr. Perry offered his mouth as an example, so do I; and I give you the same invitation to examine it and draw your own conclusions. But now for another statement, and one to me even more convincing. For some ten years I have had a summer practice at Narragansett Pier, R. I. The Pier is, as you all know, quite a noted fashionable watering-place, and the people who go there are mostly well-to-do, take good care of their teeth, and when at home make use of the best talent available. When away from home for the summer the little they require at the hands of the dentist is to relieve some temporary discomfort or pain, just enough to enable them to bridge over the time till they can get back to their own dentist. So it happens that I have had unusual advantages to notice and study the work of the profession from all parts of the country. It has been a schooling that I have profited by greatly, and I am happy to share the profit with you.

In reference to proximate faces, my observation has shown that by far the larger proportion have had face fillings in them, so much the larger proportion that I would hardly dare to state the truth to you. But that is not the whole story, or the worst part of it. In truth, I have seen a larger proportionate amount of defective work where the contour principle had been adopted than where the face method had been followed. This I know is a rather startling statement, and I do not expect it to pass unquestioned. It is not what many of you would expect, and differs widely from the "ought to be" of those whose faith in contour work is so decided. I am certain, though, that I do not misstate the facts. Do you wonder, then, that I hesitate to condemn face fillings because they are face fillings, or that I have charity for those who believe in them?

But to shift the scene, let us look for a moment or so at the arguments the advocates of contour fillings most rely on, and this I can do all the more willingly, for I do not hesitate to say that, as a rule, I fully agree with them. The only criticism to be made is that I cannot see any necessity for or understand why they lay so much stress upon them. They are so like the well-known axioms in which we were drilled at school ; and of course, being such, it would never occur to me to doubt or question them in the least. They are fundamental truths, and as such we carefully appropriate them, adding them to our store of knowledge. No one would hesitate for a moment whether, other things being equal, it was better to trust to nature for a guide and model, or to the fanciful ideas and theories of some enthusiast who claimed to have made improvements on the Author of his being, and who held a patent on a better way of adapting means to an end. Then we will take it for granted that it is a good thing to restore the lost parts of a decayed tooth and bring the beautiful organ back to its original shapely condition, to be a comfort and a blessing to the patient, and a card—a trump card at that—to the operator. Nor will we question the conclusions and statements of our Franco-American brother, Dr. Davenport, as to the form and character of the dental arch, its perfect symmetry, and the great necessity of preserving it,—viewed from both a practical and an ethical standpoint, nor the admirable articulation of the upper and lower teeth that enables them to do their perfect work during the lifetime of the individual. His paper showed many signs of great and careful study, but, like too many other papers, it carried the mark of a special pleader, and thus in a measure failed to carry conviction to all its hearers. Again, it is not comfortable to carry away from the table a good portion of your meal and have to dodge around the corner to use the toothpick. It seems a pity that the manners pertaining to good society cannot give way just a little in such an emergency, and show a trifle more respect to our many imperfections. And then to be worried with the thought that our gums are being pushed back from between the teeth, exposing the sensitive necks, and that pain and danger are being yoked together, and thus that the present discomfort means greater in the future, for it also indicates more decay and destruction of tooth-substance, is far from pleasant, though very true. Have I touched on all these arguments? No ; there is one more, which I had almost forgotten. They tell us that a tooth that has lost its normal support from its neighbors is an unstable element, and is prone to shift its position. It may twist or turn about in its socket, or move to the right or left. Again we say, that is true ; and we also acknowledge that the self-cleansing space of to-day may not be the same to-morrow, most likely will not be, unless the teeth are held in place by articulation with their antagonists. So it would seem that we are on common ground in many essentials, and yet the profession and the contourists are at loggerheads.

Just now I said I would point out some of the errors common to those who advocate so strongly the system of contour filling. I might better have said I would call attention to the fundamental error common to them all,—an error so comprehensive that it includes all others. Briefly stated it is this : They imply that, as a rule, the choice as to the method to be adopted in the treatment of proximate faces is optional on the part of the dentist, which is far, very far, from being the case ; on the contrary, the choice is hemmed in by inflexible laws and must follow their lead and direction in all cases.

And now what is the meaning of this state of affairs ? Is the profession at large incompetent or dishonest, or simply ignorant ? I do not think, in fact, that any one of these terms can properly be applied to them, but I do think just this : the filling of a tooth is a complex problem, into which many and at times contradictory elements enter. The conditions are seldom just alike in any two cases, and the personal equations of dentist and patient have much to do with the final result. That which is the best treatment in one case becomes the worst in another. Patients and conditions as found in the mouth vary more even than do our filling-materials and methods of procedure, and so it is folly to attempt to lay down cast-iron rules or put into the shape of a logical syllogism a system of treatment for proximate surfaces. The doctrine of the survival of the fittest must be our guide and sheet-anchor, but the fittest is the unknown quantity, the x, y, and z of the algebraic equation, and to find its coefficient and to determine its value takes study and thought.

Let us examine some of the elements we have to deal with. In view of the fact that the real question at issue is as to where and when to restore the original shape of the decayed tooth, it may be well to decide in the beginning as nearly as possible what that shape is. It will not do to have a false or imperfect model in our mind's eye, or we shall certainly go wrong. It is a little curious just here to notice what a very bad mistake many make in speaking of outlines of the teeth where they meet each other, showing either a great want of observation or that they are so possessed with an idea as to become mentally blind. The regular curve so often alluded to is not so common as many would have us believe. The molars are greatly flattened on their proximate faces, and their points of contact are proportionally enlarged. The bulge of the bicuspids where they knuckle or touch is by no means a constant one. In the case of the cuspids and incisors we can safely dismiss the thought from our minds, the latter naturally touching at their tips or cutting-edges, and the curved outline of a cross-section being remarkable only for its utter lack of uniformity. One would think Dr. Perry was something of a humorist, were it not for the serious earnest vein running through his paper, where he speaks of the Gothic domes and the Roman arch. As figures of speech they are beautiful, as matters of fact the symbols are far-fetched and do not apply. The essence or essential principle of any arch is the uniformity of its curves and its bilateral symmetry, both of which are utterly wanting in any section of a molar or bicuspid through its cusps. A Roman arch, so far as I can make it out, is a composite structure, a pointed arch, and I cannot find it in the cross-section of any bicuspid tooth. But the simile fails to impress, for here it is a horizontal arch, and has no duty whatsoever to perform analogous to that of the upright arch. Then as to the enamel-prisms, it is only half true that they are laid so as best to support the weight of mastication, and if the mutilation they undergo in face fillings weakens them half as much as does the under-cutting and channeling necessary to prepare the tooth for a large contour filling, then my knowledge of tooth-structure is very imperfect. And as to that grand old dome of St. Peter's at Rome, let me simply ask you the question, Which method of treatment would make it a ruin in the shortest period of time,—a slice taken from one side, which might represent a face filling, or the heavy gouge that would stand for a contour bit of work? Think of it a moment, and I doubt not you will need no answer. But it is a shell and not a solid mass, and the laws that govern its stability are utterly different from those we are considering. I also venture the prediction that had Michael Angelo been a dentist in this nineteenth century he never would have sacrificed his knowledge of physics to his love for the beautiful; true indeed he would not have "sinned against himself" by purposely or maliciously "mutilating a tooth," but he also never would have put in a solid contour gold filling without saying, "What a horrible *mésalliance* this is!" and, speaking as an architect, would have added, "How can I hope for success when I thus outrage all the laws of my craft? What a foundation this is for my solid gold column, and how can I hope to join such a base and superstructure?" From an architect's or engineer's stand-point the building of a solid mass of gold inside of the cavity of a carious tooth is analogous to building a granite house on a timber and clay foundation, with the added element of weakness that the force needed to make the layers of gold solid constantly acts to break or split the already too frail foundation. Better work, and more certain, will be done when these facts are more constantly kept in mind. The cry of the new departurists that there is an incompatibility between tooth-structure and gold has an element of truth in it, but not the one they would have us believe; the incompatibility is there, but it is not a chemical nor an electrical one. The dentine and enamel of the tooth and the gold do not act or react on each other in any way. The one is negative in the presence of the other. Such incompatibility as there is is a mechanical one simply, and is due to their purely physical opposite characteristics.

So far as the shapes of the teeth are concerned, there is no element of strength in them ; in fact, the shapes of the teeth in reference to their articulations are a constant menace to their safety. The wedge-shaped cusps of the bicuspids, in the act of mastication, tend directly to cracking or splitting the teeth, and that this is not a forced inference is proven by its more or less regularly taking place in the mouth, especially after the teeth have been weakened by decay and large fillings. Again, the fiber or grain of the tooth is far from being a strengthening feature in tooth-structure, especially in reference to helping it resist the blows of impact in mastication, and decay makes manifest this weakness in an alarming degree. If the theories of some well-known writers on tooth-structure could be incorporated into demonstrable facts and the presence of a reticulum of soft protoplasm permeating its elements were proven, what a mess it would make of strength and power to resist crushing forces ! But we hear little about that nowadays. It would seem, then, that we can look neither to form nor shape of the teeth for elements of strength. For this quality in the grindstones of the mouth we must look entirely to the basal substances which form their mass. Their strength is the strength of the materials of which they are composed, and it is a waste of time to look for others that do not exist.

I must, however, go a little more fully into the matter of the structure of the teeth in order to make my statements certain, and will add something on the effects of caries in weakening the tooth, but will necessarily omit, for want of time, any detailed statement of the philosophy of mastication. By right the two should be studied together,—tooth-structure and jaw-movements,—but this cannot be at present. The relation of the enamel-cap to the subjacent dentine is well worth considering, for it has much to with the permanency of our work, let alone its permitting of the work being done at all. The union of the enamel to the dentine is a union of weakness. Whether or no there is a true cement-substance joining the two elements of which the crown of the tooth is composed is still an open question. So far as I know, the existence of such a cement has never been demonstrated. This much, however, is certain : the union is more or less imperfect, and the force necessary to separate the enamel from the dentine is often less than that required to break or crush the enamel itself, thus following the well-known law in mechanics, that "the strength of the whole is equal only to the strength of its weakest part." When we approach this line of union we know that the danger-signal is flying. I doubt whether any dentist here present, no matter how imperfect his knowledge of tooth-structure, but has had many uncomfortable experiences of the existence of this fact. Especially is this noticeable at the neck of the tooth, where the enamel tapers to a thin edge and disappears under the overlying cement. An added weakness is here apparent in the common presence of one or more longitudinal cracks in the enamel itself. For some reason which I do not pretend to comprehend, the enamel clings more tenaciously to the dentine in middle and old age than in the earlier years of life, and it is most fortunate that it does, otherwise old people who have worn off the upper portions of the crowns of their teeth, the molars more especially, would find them breaking under the strain of mastication far more frequently than they now do. Where such teeth are well worn, so much so as to freely expose the dentine, the enamel-prisms that are left, instead of standing perpendicular to the line of impact, are inclined at an angle with it, indicating an engineering fault in the building of the tooth if patchwork has to be done. It all, however, illustrates what I said a few minutes ago, that the strength of the tooth equals only the strength of the elements of which it is composed. A curious fact might here be alluded to, namely, that the largest and apparently the strongest prisms, viz, those forming the cusps of the teeth, are least used in mastication.

A word on the structure of enamel itself, as indicated by the use of the word prisms : it is not a homogeneous material, and therefore not a uniformly strong substance. The prisms that compose the great bulk of its substance are not at all arranged as an engineer would arrange them to gain the greatest strength. The common saying that they radiate in all directions from a plane tangent to the face of the dentine is only half true. The course they take is a very irregular one. They interlace and twist greatly, and again we must say that this is not as man would have arranged things had he had the ordering of it to gain resisting power. Further, the enamel is exceedingly brittle,—a quality greatly due, as I think, to the peculiar histological arrangement of the elements of which it is composed. The dentine is tough, dense, and elastic, having great resisting power to crushing faces. A fairly homogeneous material, but weakened greatly by the radiating tubules that permeate its mass, giving it as it were a fiber or grain and making fracture more easy to accomplish, more liable to occur when the tooth is weakened by decay or when undue force is brought to bear upon it.

So much for the composition of the normal tooth. Let us go a step farther and see how it is affected by decay (caries, so called), in order to further comprehend the condition of the tooth as it presents itself when requiring treatment. A few words will suffice on this point. Some one (I think it was Dr. Farrar) has said that the model cavity to fill was one made in a healthy tooth, not by caries, but by cold steel,—the idea being that such a cavity would have all its walls sound and strong. The gold could be packed in firmly, filling the cavity completely, and permitting of good condensation at its edges; and further, that the sound tooth-structure would resist future decay at the margins of the filling much more effectually than the same structure would if it had been subjected to the disintegrating action of the acids producing caries. Dr. Farrar was right. It is seldom indeed that in the preparation of a cavity for a filling all the affected portions of the tooth are removed: safety and expediency both forbid it; and even where thorough excavating can be done, no eye is perfect or touch delicate enough to tell where the unsound ceases and the sound commences. The shading of the former into the latter is most gradual, and long before our senses take cognizance of the change the microscope in the ground section would demonstrate it. There never is, then, a well-defined line of demarkation between the two; no matter what theory of decay one may accept, they all meet on this common ground. Again, caries acts unevenly, not uniformly at all. It seeks cracks and crevices, and in these exposed places manifests itself most strongly. A favorite place is the line of union between the enamel and dentine, and here it will often produce profound trouble, and that, too, out of sight and reach. The study of the histology of the teeth shows much irregularity just here, and frequently of a nature to invite the undermining action of the acids of decay. So it is that we have no sure rule and measure to go by. Judgment founded on an accurate knowledge of tooth-structure, and how it is affected by caries, must be our only guide.

These thoughts are fundamental to success in practice, and cannot be questioned, and yet where in the many writings on the subject can you find them more than suggestively alluded to? If accurate knowledge is required anywhere, it is just here. The foundation on which we are to build must be understood, and its weak points as well as its strong ones well kept in mind. The relation between its strength and durability and the destructive forces that will unceasingly act to bring ruin and failure in the wake of our most elaborate efforts, must be constantly borne in mind. Every factor that makes success doubtful must be studied and measured, or guarded against.

Having in brief touched on some of the prominent points pertaining to the structure of a tooth, those most likely to have a direct bearing on success in operation, let us now as briefly look at the prominent characteristics of the metal gold. This is equally essential, for the two are to be joined together for weal or for woe in the finished work. The first point that strikes us in this inquiry is the total dissimilarity of gold to any of the elements of tooth-structure. So much so is this that we are at once forced to the conclusion that those qualities in gold which make it a valuable filling-material are made practical and useful directly at the expense of the integrity of the tooth itself, the foundation into which it is to be anchored. In other words, we employ it only because it meets certain requirements essential to a perfect filling better than any other material we know of; but to obtain these advantages we know that from an engineer's stand-point we necessarily accept corresponding weaknesses, and that on the correct balancing of these good and bad points depends our measure of success. We must know that the balance is in our favor, or seek elsewhere for a filling-material.

First as to the good qualities. Gold is indestructible in the mouth. It resists absolutely the solvent action of any or all of the fluids of the mouth, and practically, when well packed, cannot be injured by the mechanical abrasion following mastication; and secondly, it admits of a fairly high polish and retains it. These are the two valuable qualities we seek, and in these respects it far exceeds in value any other materials we can employ. Its bad qualities are many: its color and its heat- and cold-conducting properties are very objectionable, but far worse are those qualities inherent in the metal itself, which cannot be altered or amended, and which make its perfect adaptation to the walls of the cavity and the shaping of it afterward a matter of such great difficulty.

Ingot gold is dense and solid in every respect, and in making contour fillings we aim to reproduce this condition as far as possible, and to do this we rely on that property in pure gold which enables us to weld piece to piece at ordinary temperatures. Without this quality contour fillings of gold would be an impossibility. To make use of it, the one essential is to bring the successive bits of gold in perfect contact free from the presence of moisture. Now, this seems to be a very simple thing to do; but in practice it is far from simple or easy. A decided amount of hardness belongs to gold, and this quality is rapidly developed in our systems of packing, and it is in the force required to overcome this hardness that we meet with our greatest difficulty. Let me illustrate. If we take two pieces of fresh cohesive gold and anneal them, we can pick up one by the other by simply bringing them in contact, and the slightest pressure will make them one, perfect union between the two surfaces being so easily obtained; and this we could repeat an almost indefinite number of times if we kept our surfaces parallel; but the moment we depart, in the slightest degree, from this perfect parallelism of the opposing surfaces we find more or less force required, and if to this departure is added increased thickness in our foil, greater force would be required. Now carry these two thoughts into your growing filling: we see at once that the condition of parallelism is an impossibility, the shape of the cavity absolutely forbidding it, as equally do our methods of introducing the gold; and here we see how the necessity to use force is developed. The greater the thickness of the bits of gold employed, added to the lumpy uneven surfaces to which it is to be joined, the greater the force required, other things being equal; and on the contrary, the more even in thickness our pieces of gold and the more perfect the plane of the surface to which they are to be attached, the less will be the force required to weld them together. There is an absolute proportion or ratio between the two, and you cannot alter one factor without altering the other to meet it. The pieces of gold then should, as far as possible, be of a uniform thickness, so that uniform graduated force may be applied, a force well within the power of the walls of the cavity to withstand. Of course, the smaller the pieces of gold the greater will be the time consumed in condensing properly, but this cannot be avoided. Gold is gold, no matter in what shape or form it may be presented to you, and its qualities cannot be altered by any art or device of the manufacturer. An absolute ratio exists between the three elements that combine to make a filling,—gold, force, and time,—and they are unchangeable.

It will not be out of place just here to say that no one took into consideration these facts and laws more decidedly than did Dr. Varney, and that his system, and especially the beautiful instruments for packing gold he devised, were based on a thorough comprehension and appreciation of them.

Crystal gold is a beautiful preparation, but my objections to its use are twofold: First, the difficulty in making the pellets of a uniform size and shape, and second, the further difficulty that exists in making it take an even, flat face. Skill and patience will overcome these objections; but we should avoid difficulties, not seek them, so I adhere to the good old-fashioned gold foil, folded into strips and cut evenly. A cohesive gold filling should be homogeneous throughout, and adapted perfectly to all the walls of the cavity.

So far we have considered only the physical peculiarities of tooth-structure and gold, and their relations to each other, and we have seen how ill fitted they are to make a harmonious whole. There are, however, other objections to the solid contour filling that cannot be overlooked if we wish to form a correct estimate of its advantages and disadvantages. Taking the supposition that our skill is perfect, and that the solid gold can be built into the cavity and outside of it so as to restore the original shape of the tooth, what other elements of safety are we to observe before settling on a plan of procedure, which may operate to its disadvantage when the work is completed? The first one I would draw your attention to as having a direct bearing on the life of a filling is the rapidity with which decay proceeds. That the greatest difference exists in this respect we all know, nor need we go into its why and wherefore. All dentists acknowledge that at times it is all but impossible to arrest decay, no matter how hard they try or what means they adopt. Tooth-destruction continues in spite of their best efforts.

Standing by the chair of one of our ablest men in a neighboring city, I watched him as he excavated several places preparatory to doing genuine patchwork around some gold fillings. As I watched him, he told me of the great trouble he had experienced in doing anything satisfactory for his patient. Sooner or later decay recommenced, and he had about abandoned all thought of attempting what would be called permanent work, and so, for the time being, his reliance was on gutta-percha. All this he said in the presence of his patient, an intelligent, cultivated lady, to whom evidently the story was far from new. In fact, as we talked she took part in the conversation, and showed much good sense and judgment, and a kind appreciation of all that had been done for her. I could not but admire the straightforwardness and honesty of my friend, and said as much, and was thoroughly convinced in my own mind that he had adopted the very best plan to minimize pain, trouble, and expense for his patient, and at the same time give her the use of her teeth for the greatest length of time. Though it was not put in so many words, it was a confession of judgment on his part that contour work and hard gold fillings would only result in continued failures, and jeopardize both his reputation and his patient's teeth. I noticed, though, that there were many places where the beautiful contour work would have served an admirable temporary purpose, and would have afforded great temporary comfort, but its use was plainly contraindicated by the malign condition of rapid decay existing in her mouth. If it is a reasonable certainty that fillings will need constant attention, then that kind of filling should be adopted that will entail the least trouble and consume the least time in giving them the requisite care. Acknowledging, as we all do, the greater difficulty in making an absolute water-tight filling with hard gold than with any other material, it would appear to be well indeed to sacrifice some present comfort and elegance for the greater good in the end. If we must patch, let us patch that which can be most readily examined, removed if necessary, and watched and cared for with the greatest facility.

Another point to consider, and that, too, independent of all other considerations, such as time, trouble, and expense, consists in the shock given to the tooth by long-continued and painful handling ; and this is a serious point which most of us have had many times forced on our attention. I have repeatedly said to my patients that pure selfishness and cold policy would force me to make my operations as painless and as little irritating as possible, for though they might bear it all well and comfort themselves with the thought that it was unavoidable and for their good, I knew that much of my success depended on the avoidance of pain, for the tooth would not be able to stand what they could, and would either rebel openly and quickly or would crumble and give way in the end. Many and many a valuable tooth has been sacrificed on the altar of a too great ambition to excel in this particular direction, the life having been fairly pounded out of it, or it has been left in such an irritated, sensitive condition that there has been neither peace nor comfort with it; the slightest excess of heat or cold, whether from food or air, producing discomfort or positive pain, the inevitable ending being either death of the pulp, the formation of nodules in its substance, or periodontitis more or less severe. Do you wonder that patients who have submitted to this extra torment and the added element of exhaustion have asked themselves the question, Does it pay? and, answering it in the negative, quietly wandered off to some less enthusiastic idealist who does save teeth notwithstanding the hue and cry he is subjected to, and does it in a simpler way, using less than half the time, taking fewer risks, and giving fewer pains? I tell you, gentlemen, there are two sides to every question, and there are two sides to this.

But what are we to do where the patient, having full faith in her dentist and being both willing and anxious to have the best work possible done, is simply physically unable to bear the prolonged discomfort or pain requisite for the completion of the operation,—cannot stand the shock? Must he or she put up with amalgam, gutta-percha, or oxyphosphate whether it is indicated or not? It would seem so from the manner the enthusiasts talk and argue. But calm, sober judgment says, No. The maximum of safety and success can be obtained in another way, and this element of weakness and inability to endure pain must have its proper consideration. I have sent many a patient to bed and put them under a doctor's care through my over-eagerness to carry out this contour ideal. I have been lectured by mothers and husbands, and have received notes from physicians who were good friends, telling me that my reputation was in danger, and urging me to be more careful in the future, and I have found it proper and right as well as wise to heed the warning. It is in such cases as this that face fillings find their proper place.

Let me go a little more fully into still another point that demands attention. Every contourist draws the line somewhere between the strength of the tooth,—the foundation, and the mass of gold,—the superstructure, and acknowledges that beyond that line he cannot go with safety. He will strain a point at times, but no more. This line, to be sure, is an imaginary one, in that it varies constantly as the conditions vary that present themselves, but it is none the less definite enough, so that its proper boundaries can be marked out with some degree of certainty and sharpness. The danger to be avoided is that of breakage from what might be called a top-heavy filling. Taking it for granted that after a cavity has been properly excavated and shaped the tooth-structure left is sound and healthy, and the pulp not too nearly approached, what proportion of the crown of the tooth must be left to insure safety, and what relation will the shape of the cavity and its proportionate size have in the same direction? As stated before, the factors we have to consider are constant and cannot be changed. As we find the tooth to be operated upon, so it remains, so far as its structural strength is concerned, and gold is unchangeable. By removing a portion of the tooth-substance to obtain a firm anchorage we simply weaken it, and this is unavoidable. Now let us see where we can draw our lines. To do this we will have to again refer to the anatomy of the tooth. First, then, I would say that in the bicuspids, and more especially the molars, it is not prudent to attempt to restore the shape of the tooth where the cavity extends below the gingival border to any extent; and when in addition the floor of the cavity is broad, extending well across the face of the tooth, it is almost prohibitive. To adjust the rubber-dam in such cases is a matter of great difficulty, and the thorough packing of the gold is equally so. Special pains will have to be taken and much time consumed to make even a fair start, but the excavating in such cases is extra hazardous. The pulp is likely to lie well toward the surface of the tooth, and is easily exposed. A retaining shape or point is most desirable just here, but to purchase it at the expense of an exposed pulp will not pay; to cut even half-way to the pulp is risky, and that much oftentimes is not enough to secure a good hold, but it is quite sufficient in a sensitive tooth to insure future trouble. Difficulties and dangers, in fact, in these cases multiply with great rapidity, and prudence soon calls a halt. Each operator will fix his own limits, but the elements of strength of material, sensitiveness, and ability of patient to stand pain, to endure the shock, and the liability of recurrence of decay, will all have to be well considered, and the ideal will have to give way to the practical in many a doubtful case.

Last, but not least of the many objections I will refer to, is the one of expense. The opprobrium of the dentistry of the day lies just here. Incomes are limited, and twist and turn as we will the ability of a patient to pay bills must be considered; and it is quite certain that if we do not consider this factor in the problem our patients will, and in very decisive ways. It is all very well to say, Do the best anyway, but even those who talk the loudest cannot turn their offices into eleemosynary institutions, and they do not attempt it, nor would it be right or just in them even to think of so doing. A dentist has so much time and so much strength per diem to sell, and no more. In this respect his practice differs from all other professions. The physician, the lawyer, and the minister each and all can put in a great deal of extra or charitable work with far less exhaustion of their capital than can the dentist, and so, even where other indications favor, the more expensive, difficult, and time-consuming operation must give way to the simpler and more quickly accomplished.

It is still an open question whether teeth decay, or rather whether the initial steps to decay commence, where the teeth are in direct contact. Dr. Bogue questions the fact in one of his papers, and I think Dr. Bonwill does also. So often have I noticed these early beginnings a little to one side and more frequently toward the palatal faces than the contrary, that I feel certain that at best it can only be a rule where the exceptions are many and positive. So the contour filling does not always arrest decay, even where gold touches gold, but may even invite it unless the finish is perfect. No mention is made of those cases where contour fillings would be contraindicated by the difficulties attending their insertion from a dental stand-point, such as pertain to out-of-the-way places where the dam cannot be adapted, small mouths, etc. Still these cases exist, and in daily practice have to be considered, and they limit the adoption of the contour principle very decidedly.

Before proceeding further let me here briefly summarize the objections to contouring, as follows: 1, Lack of homogeneity between gold and tooth-substance; 2, difficulty of getting good foundation; 3, impossibility of perfect condensation of filling; 4, danger of subsequent undermining from caries; 5, strain and shock to the tooth; 6, expense; 7, frequent contraindications, from locality and other circumstances, that will compel in actual practice the abandonment of a constant theory.

If, then, there are so many and such serious objections to contour fillings as the practice *par excellence*,—if it cannot be made to fill the bill entirely, and if dentists either cannot or will not adopt it to the exclusion of all others,—what are the alternatives, and what their advantages? I will take a few minutes more of your time in which to consider them.

Leaving out of the question that large class of cases which all recognize as properly calling for the use of plastics or amalgam, let us consider only those which with some degree of propriety might be said to fall within the domain of the gold requirements, which can be filled with gold and which ought to be. Do face fillings meet a decided want? do they supply a need in our methods of procedure? I am quite certain they do, and that to the end of the time when gold reigns supreme as a filling-material they will continue to serve a most useful purpose and will hold their own against the assaults of extremists and idealists with an ever-increasing vigor and strength.

In pointing out the weak points in contour work, I gave you many of the strong points of face fillings. Most of the dangers that are inherent in large, heavy gold contour work lose much of their force and prominence in the less pronounced face filling, which takes less force, less time, but by no means less skill to perfect it. It is not necessary to compare them, for the bare statement meets with a ready assent. If we shorten the time and lessen the force, we necessarily lessen the dangers. So much only will I say for the operation itself; but how about comfort and durability? As to comfort, I grant that the open space where the food crowds in makes a poor showing beside its closed competitor, but even here I think too much has been said about a minor point. Even as I write this, a good patient, to whom expense means little, declines, in a favorable case, to have a space closed with contour work, and gives as a reason that he does not think it will pay for the extra bother and time. As to durability, I am far from sure that the contourists carry the day. If I should state the facts as they seem indicated to me, I would say that the best work of both kinds are nearly on a par in this respect. I have been fortunate in being able to compare for many years some of the work of Drs. Dunning and Townsend side by side with contour work of other able operators, and time seems to make but little difference in handling them. The great excellence and durability of Dr. Dunning's work consisted in two things,—the thorough conscientious packing of the gold, and the equally thorough and conscientious polishing afterward. In these two respects he has never to my knowledge had a superior.

I am ready, though, to say that *where all indications are favorable* the contour work is both theoretically and practically the best. Dropping a little in the grade of work, and the scene shifts. Poor face work is poor work indeed, but poor contour work is a horror. Who questions this statement?

Separating teeth by filing when filling is only slightly or not at all indicated cannot be considered wholly bad practice. It is even at times a wise method of procedure, as when decay is superficial and covers a good portion of the surface of the tooth. It can be done carefully, wisely, and according to correct principles, or it can be done in a slovenly manner and without thought.

There are other ways of separating than by the V-shaped slot, though even this rude way has saved many teeth; and if the equally valuable part of the operation, viz, careful polishing after filing, had not been so frequently neglected, many a good word could have been said in its favor. There are more sins of omission in this respect than in any other that I know of in operations on the teeth, and they have borne bitter fruit. Why do not the contourists lay as much stress on the necessity of copying nature's model in this particular as in the other,—that of restoration? It is most certainly just as essential to success. Only within the last week two such cases of file-separating in one mouth have presented themselves where the success has been most marked; years have gone by since the separations were made, but to-day there are no signs of failure. In one class of cases I invariably make the V-shape opening,—that is when I want to save the sixth-year molar. Of course the sixth-year molar is not touched, but a good piece is taken off the posterior face of the temporary molar, and this practice I find to be almost universally good. Why, then, can it be so reprehensible where the permanent teeth only are considered?

In conclusion, let me quote the advice once given by old Samuel Johnson to a friend seeking information on a special subject. "Write a book on it," was the brief reply. But I notice the quotation from a personal stand-point only. The writing of this brief essay has set me thinking in many ways, and aside from the compliment paid me by the society in tendering the invitation, and which was duly appreciated, I have to thank them still more for the good that I have derived from making it a study. Taking it all in all, it is the biggest and most important subject we as dentists are called upon to consider, and now as I am about to lay by my pen I feel that I have most imperfectly placed it before you. Simple as at first sight it seems, it is in fact a most complex one, and whilst requiring accurate knowledge as a basis for its consideration, also calls for a well-balanced judgment—so many things must be thought of. There has been a well-pronounced growth of sentiment in the profession in favor of restoration of shape and the replacing of lost substance, but not in so marked a degree as the claims of its special advocates demand, nor will there ever be. Too much has been claimed, and too much wholesale denunciation indulged in, to bring about the best results. In many cases the recoil of the gun has done more damage to friends of the system than to its foes. The best men want to do this artistic work, but they want to feel that it is not only artistic but the best in all ways. In the main they are conservative, and in their practice elective. The system of separation and leaving a self-cleansing space, as advocated by the late Dr. Arthur, has few advocates at present. There were and there are merits in the system, but the profession has as a whole outgrown them. Commencing my professional life as a thorough believer in cohesive gold and its many advantages, I have passed as others have through many changes in thought and practice, pulled hither and thither by the many schools and their claims to consideration. To-day I am well advanced in the ranks of the contourists. The file and the disk, except for polishing, have been well-nigh banished from my case, and my memory hardly goes back to the time when I have deliberately separated teeth with a file of any description. I have employed these instruments only to trim edges, finish, and polish, but I do not push the building out of a tooth to the limit of my ability or to the verge of prudence. In my efforts to improve I have tried many experiments in the direction of producing instruments to expedite finishing and polishing, and I think with some success. Those that I have exhibited seem well adapted to their purpose, at least they help me greatly. Years ago when at college I spent some time in polishing some lenses and became acquainted with the value of Hindostan powder, and have found it since then most serviceable in my practice. By washing it carefully every grade demanded can be obtained, and of uniform quality and fineness. It will do its work rapidly and without scratching.

Gentlemen, I thank you for your kindness and patience in listening to this too long paper. I sincerely hope that in nowise have I discouraged any one from doing his best to restore the shape of the teeth where possible, but I also hope that in asking you to be cautious and prudent, and to exercise charity in passing judgment on those who differ from you, I have not swerved from the path of duty or exceeded my prerogatives as an essayist.

SODIUM SILICO-FLUORIDE IN DENTISTRY.

BY H. E. VAUGHAN, D.D.S., SPRINGVILLE, N. Y.

The first statement in regard to the medicinal properties of this salt was made before the British Medical Association, in September, 1887, by Mr. Wm. Thomson, F.B.F.C., F.C.S., of the Royal Institution, Manchester, England, at the conclusion of a series of experiments to determine the disinfectant properties of different substances. By these he found that the compounds of fluorine were the most powerful, and of these the sodium silico-fluoride was probably the most serviceable.

Because of these statements work was begun in the clinic room of the Philadelphia Dental College with this medicament during the session of 1888–89, hoping to find in it a substitute for hydrogen peroxide, that being objectionable on account of its changeable character and the occasional pain from its use.

The preparation of sodium silico-fluoride is very simple. A mixture of fluor-spar and any siliceous substance, as sand, is heated in a retort with H_2SO_4, the resulting gas being distilled over through mercury into water, which holds it in solution, and which is then filtered to remove the free silicon which precipitates. The filtered solution is then carefully tested and the acidity neutralized by carbonate of sodium when the sodium silico-fluoride or fluo-silicate of sodium precipitates. Properly prepared, this should give a perfectly neutral reaction to litmus paper.

Since in most instances the salt will be used in solution, the first experiment would naturally be to determine its solubility. To determine this I took twenty grains of the salt and added two fluidounces of distilled water. It was then mulled in a mortar and shaken for ten minutes. The temperature of the water at starting was 60° F., which was raised two degrees during the shaking. Allowing this to settle for a few moments, I then took a piece of filter-paper weighing thirty grains and filtered the solution ; then drying the paper thoroughly, it and the remaining salt were found to weigh forty grains. Subtracting the weight of the paper (thirty grains) left ten grains as the weight of the undissolved salt. This taken from twenty grains, the amount of the salt used, left ten grains dissolved in two fluidounces of water, or five grains to the fluidounce.

To determine if this amount might be increased by warm water, I tried a second experiment, the same as the preceding, except that the temperature of the water was 195° F., and found that thirteen grains were apparently dissolved, or six and one-half grains to the fluidounce of water. This solution, however, soon became turbid. Allowing time for this to settle, it became clear with a slight precipitate. This was filtered after stirring up the precipitate, carefully noting weights as before, and it was found that two grains had been precipitated, leaving eleven grains still in solution, or five and one-half grains to the fluidounce.

These results not agreeing with those of previous experimenters, a cause was sought for. At first I thought it might be accounted for by a difference in the manufacture of the salt, but on consulting Mr. Bullock, of the firm of Bullock & Crenshaw, of Philadelphia, he very kindly informed me that all the salt used in this country is imported, and that it is chiefly manufactured by one firm of London, England. He furthermore added that the manufacturers reported that the solubility of the salt decreased to a certain limited extent as its age increased, and that to this was probably due the difference between my results and those of previous experimenters, some rating the solubility of the salt as high as seven grains to the fluidounce. Having no opportunity to procure the freshly-manufactured salt, I accepted this as the probable explanation. This change of solubility is believed to be the only one which the salt undergoes on account of age.

In all the following experiments a solution of two grains to the fluidounce was used, unless otherwise noted, this strength having been found both by experiment and by clinical experience to be one well suited to most purposes.

The solubility having been determined, the next step was to test its value as a dental disinfectant, and for this purpose the following experiment was performed. Three freshly-extracted teeth having putrescent pulps were selected and treated as follows :

No. 1. The pulp-chamber and root-canals were merely opened, and with no care or preparation were filled by a taper twist of cotton saturated with the solution.

No. 2. The pulp-chamber and canals were moderately well cleansed, using broaches only, and filled as in the preceding case.

No. 3. In this, a lower molar, the pulp-chamber and canals were cleansed as thoroughly as possible,—as a tooth would be treated where good access was to be had. This was then filled like the others.

The openings into the three were then closed with "temporary stopping" and the teeth placed in separate bottles of water, and kept at a temperature of about 60° F. At the end of ten days the teeth were opened and the cottons withdrawn, and placed, by the kindness of Prof. Laplace, in culture-fluid, due care being exercised to prevent contamination by atmosphere or instruments. These were then labeled 1, 2, 3, respectively, corresponding to the order given above. In case of the third, however, the opening being small through which one twist of cotton was drawn and contamination being feared from this cause, the crown was excised and a second cotton twist placed as before, being labeled 3′. At the end of four days the result was as follows :

No. 1. Turbid, showing an abundance of germs.

No. 2. Clear, showing *no* germs.

No. 3. Slightly turbid, showing some germs.

No. 3′. Clear, showing *no* germs.

This proved it to be efficient as a disinfectant even where only very slight care was given to the canal work ; also, by the difference between 3 and 3′, showing the care necessary not only in experimentation but in practical work.

Having proven that it was a reliable disinfectant, it was next to be determined whether it left the canals in condition for further treatment, or if, in other words, it was an escharotic coagulant. To ascertain this I took three test-tubes and in each placed one fluidrachm of pure egg albumen. To the first I added two fluidrachms of a five-grain solution of the salt. To the second I added the same amount of a two-grain solution, and to the third a like amount of distilled water. These were then kept at an equal temperature of about 60° F.

At the end of eighteen hours the coagula formed in the three were apparently the same, thus proving that sodium silico-fluoride even in a saturated solution is not an escharotic coagulant. It is, however, a slight irritant in saturated solution, as is proved by the following experiment:

Upon the arm of a patient a cloth was bound and kept wet by a five-grain solution of this salt for four hours. The result was a slight reddening of the tissue and a slight tenderness to the touch. This property, while not strong enough to be a disadvantage, being only present in saturated solutions, is a positive advantage in the treatment of pyorrhea alveolaris.

So far as I know, this substance was first used dento-clinically in this country during the session of 1888–89 in the Philadelphia Dental College, where a two-grain solution was given the students with a request to use and report.

I have now a record of thirty-seven cases which have come under my personal care, all but two having been satisfactorily treated with this salt. From this number the following have been selected:

Case 1.—Patient a man about twenty years old; tooth a superior left central incisor which had had an abscess with fistulous opening for three years and was quite loose. It had been treated by several practitioners by different methods, but the fistula remained open with a constant discharge of pus. The tooth was opened and the dressing removed January 15, 1889, and a solution of the salt forced through the canal and fistula. The canal was filled with cotton saturated with eugenol. At the end of ten days, a slight swelling appearing on the gum, the canal was again opened and treated as before. February 18, no further trouble appearing, the tooth was permanently filled, and still remains in satisfactory condition.

Case 2.—For the same patient, February 3, 1889, a superior right lateral incisor having a putrescent pulp and a fistulous opening was treated. The tooth was opened and the canal cleansed, and the solution forced through. The root was filled with cotton and eugenol, and a temporary filling placed over it. It was permanently filled March 4, with no subsequent trouble.

Case 3.—Patient a young lady; tooth a superior left central incisor, the pulp of which had died under filling. The canal was cleansed and disinfected with permanganate of potash. Upon being filled, the tooth immediately gave trouble, and after stopping and unstopping it several times the following treatment was instituted: May 13, 1889, the dressing having been removed on account of the pain experienced, a quantity of the solution was forced into the canal and through the foramen, the patient complaining of the pressure causing pain. The canal was then thoroughly dried, and filled as before with cotton saturated with eugenol. The tooth was permanently filled May 27, and up to date, over nine months, not the slightest trouble has been experienced.

Case 4.—A case similar to the above was reported to the writer by Dr. Ickes, of Philadelphia. A tooth having been repeatedly treated and filled, with constantly recurring trouble, was at length filled with a paste of this moistened salt placed on cotton. Up to date, over seven weeks, no further trouble has been experienced.

Case 5.—Patient a man about fifty-five years old ; tooth a superior right lateral, loose from pyorrhea alveolaris, apparently caused by tartar. The root was thoroughly cleansed at two sittings and then ligated by waxed floss silk so as to be held firmly in place. January 23, 1889, the pocket was syringed with a five-grain solution of the salt for three consecutive days. It was then left for two weeks, when it was again syringed. At the end of four weeks the ligature was removed, the tooth being quite firm. At present there is no discharge of pus and the tooth is reasonably firm in its socket.

Case 6.—I have now a similar case of a superior left first bicuspid which is being treated in the same way, except that the patient needing a plate to supply other teeth, one was swaged having a support on one side, and to this the tooth was ligated. The opposing tooth was ground off slightly to prevent a too forcible occlusion. At present there is no indication of pus, and the signs are very favorable for complete recovery. In both the above cases there was a history of the loss of previous teeth from pyorrhea.

Another quality of the solution of fluo-silicate of sodium noted in clinical work is its power as a deodorant. One application either by syringing or by wiping out with cotton is sufficient, generally, to neutralize the odor of the most offensive putrescent pulp, a quality not by any means to be despised. Being inodorous, it acts not by substituting a less offensive odor, but by destroying the putrescent material by taking away its hydrogen.

From the foregoing it will be seen that sodium silico-fluoride is, when properly used, capable of becoming one of the most useful salts in the dental pharmacopœia. As a disinfectant it has been shown to be powerful enough, even in weak solution, to markedly antagonize the germs of putrefaction ; as a coagulant, to be non-escharotic ; as a deodorant, strong enough to destroy the most penetrating of putrefactive odors ; as a stimulant, strong enough in full solution to cause new tissue to form and yet not act as an irritant to surrounding tissue. It is practically unchangeable, the only change being that noted regarding its solubility, which is not of the slightest practical importance.

Such being the case, it would seem to be the best medicament of its class as yet known, and to be at least worthy of most careful consideration and of extended experimental utilization by the dental profession.

SPLIT-TUBE TEETH-CROWNS.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

THE subject of artificial tooth-crowns has received a large share of professional ingenuity and investigation during the past few years, and there are yet to be developed and disclosed new aspects of the well-known generic forms, and also new methods of mounting them.

The exigencies of dental practice are so varied and often surprisingly peculiar that amid all the multiplication of crowns known to the dentist there are times when not one can be found exactly suited to the case in hand. It is therefore of real utility to add another and yet another to the list of crowns which may be adapted for occasional application, if not for very general use. On the other hand, there are great obstacles in the way of producing such crowns as require molds for their manufacture, because of the well-nigh infinite variety of sizes and shades necessary for the selection of, it may be, a single suitable porcelain crown; and the making of one or more special crowns is not only a difficult and costly process, but it also involves a delay which is often practically prohibitive.

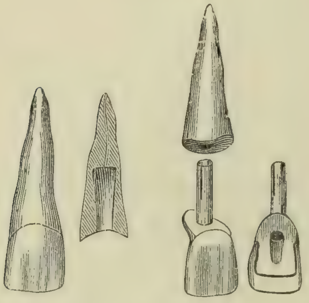


FIG. 1.

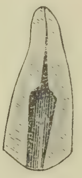


FIG. 2.

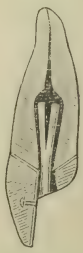


FIG. 3.

In the DENTAL COSMOS for April, 1879, page 232, there is shown and described by Dr. H. K. Leech a tooth-crown composed of a porcelain face soldered to a metal back that is also soldered to a roof-shaped root-plate from which a split tube extends, after passing through the plate (Fig. 1). This plate had been previously fitted to the roof-shaped end of the root (Fig. 2), the canal of which was internally enlarged both labially and lingually to give it the dovetailed form shown in the figure.

A little gutta-percha on the under side of the warmed root-plate would, when pressed into place on the ridge of the root-end, hold the crown steady, while through its lingual opening the split tube could be expanded by a filling of gold or tin, and the crown be thus securely dovetailed onto the root, as shown in the section (Fig. 3).

In the course of some endeavors to devise improved styles of tooth-crowns, the writer originated a form of porcelain crown having a tube baked into it, as shown in Fig. 4.

The mode of mounting it is similar to that of Dr. Leech, and the result is shown in the section (Fig. 5).

To such as are doubtful of the expediency of immediate root-filling these split-tube crowns afford some advantages. For instance, after preparing the root, as at Fig. 2, the apical portion of the root is packed with a single wisp of cotton and the crown mounted as previously described. Then the filling in the tube is drilled with a small flexible drill, as say No. 161, taking care to work slowly and to frequently remove the chips, until the cotton is reached. A barbed broach will serve to withdraw the cotton plug, and the root can then be treated as usual through the artificial root-canal. This can afterward be filled temporarily or permanently, as the operator may elect.

Another way of accomplishing a like result is to insert a piece of piano wire, No. 23, smooth and well oiled, in the canal, as in Fig. 5, and let the end of the wire project say one-quarter of an inch from the root-end. Over this wire the tube-crown can be placed, and, with slender pluggers, the amalgam filling be packed into the tube and around the wire. After the amalgam has set, the wire can be withdrawn, leaving a fine passage for medicaments in the further and final treatment of the tooth.

FIG. 4.

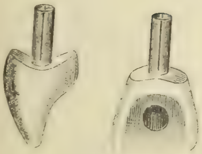


FIG. 5.

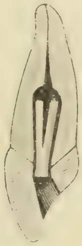


FIG. 6.

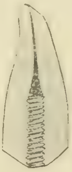


FIG. 7.

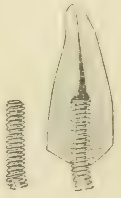


FIG. 8.

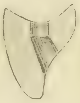
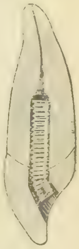


FIG. 9.



One advantage of the platinum-tube crown is, that the split tube may be filled and spread with a quick-setting amalgam ; or with copper amalgam, if its alleged aseptic properties are deemed desirable in the root-canal.

Quite a different mode of tube-mounting is feasible by means of the dovetail all-porcelain crown. The root is drilled and tapped as shown in the section (Fig. 6), and the tube, threaded on its outside, is screwed into the root as shown in section at Fig. 7. The dovetail crown (Fig. 8) is put over the tube pivot and fitted accurately to the roof-shaped root-end. A little gutta-percha (or cement) on the end of the warmed dovetail crown will, when hard, hold the crown in place while gold, tin, or amalgam is packed around the screw-tube. This is first packed with cotton to keep out the filling-material, if it is intended to keep the canal open for a time after setting the crown. Otherwise the tube should be filled solid with cement or amalgam, and the result will be such as is seen in the section (Fig. 9). A solid screw-post will often prove to be the better, simpler, and cheaper mode of attachment (Fig. 10).

Some advantages are thought to accrue from a metal root-plate like that of Fig. 11 attached to the tube if that is plain, or fitted to the tube if that is threaded, as shown in Fig. 12.

An accurate fitting of the porcelain crown-end to the root-end will, however, subserve every purpose when gutta-percha is used in the joint. But if cement is to be employed, the root-plate should have a narrow cap-border, else the ordinary cement will soon disappear and expose the root-end to decay, besides weakening the support of the crown.

FIG. 10.

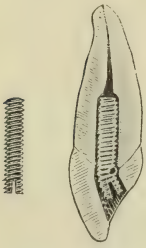


FIG. 11.

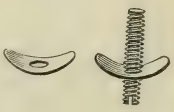


FIG. 12.

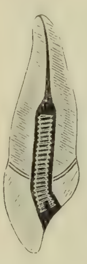
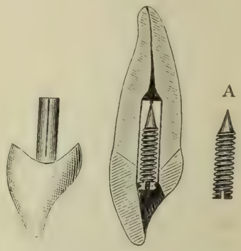


FIG. 13.



In Fig. 13 is shown a tube threaded on the inside to fit the screw A, and tapered at its outer end to correspond with the coned end of the screw. The root is drilled the exact size of the tube and may be dovetailed as in the previous instances, but is preferably left of equal diameter throughout. After the final fitting of the crown, the screw, which has been kept in the tube, is with a screw-driver given a forward turn or two, and the cone expands the split end of the tube tightly against the walls of the canal cavity and thus holds the crown firmly in place. It is obvious that this crown can be easily removed for any purpose, and replaced securely as often as may be desired. This is an excellent mode when the root and crown axes are in line so that the screw-driver can be held straight with the screw, which is but seldom the case in practice, because the normal crown axis is at a considerable angle with the root axis. Hence the practical failure of many ingenious tooth-crowning devices which assume the continuity of those axes.

The dovetail crown affords a means for setting crowns in superior style as follows: Bevel and *polish the root-end and its edges.* The common roughness of the dressed root-end is a cause of its early decay under the crown. Fit a stout straight, square, or oval platinum post in the root (Fig. 14). Pierce a piece of No. 40 platinum plate, and trim and fit it to the root-end around the post (Fig. 15). Take an Ottolengui root-reamer and drill a hole in the rubber tip of a lead pencil, and then file a groove across the tip-end (Fig. 16). With this tip press the platinum plate onto the root-end. Adapt and articulate a dovetail crown on the plate, and with melted hard wax stick the crown to the post, and with soft wax evenly fill any crevice between the crown and plate. Carefully remove crown, plate, and post, and invest in plaster and marble-dust, which should cover the face and base of the crown. Then pick out the hard wax, melt out the soft wax, and pack in well-wet enamel around the post and between the plate and the crown. Fuse in the Parker furnace and slowly cool the piece, which will resemble Fig. 17. A great variety of special crowns may thus be made. Mount with sandarac varnish in the perfectly dried root, and the crown will meet every reasonable expectation (see Fig. 18). Groups of such crowns may serve as piers for intermediate bridge-work. Collars may of course be combined with any of the organizations thus briefly described and incompletely shown.

FIG. 14.

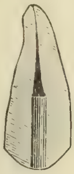


FIG. 15.

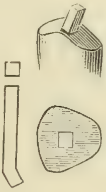


FIG. 16.

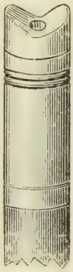


FIG. 17.

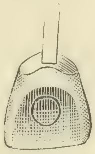
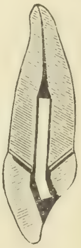


FIG. 18.



CRYSTALLINE GOLD VS. FOILS.

BY JAMES LESLIE, D.D.S., CINCINNATI, OHIO.

(Read at the meeting of the Mississippi Valley Dental Association, held in Cincinnati March 5–7, 1890.)

It is now just fifty years since I introduced cohesive gold foil to the dental profession, and although it was condemned by many of the comparatively few dentists in practice at that time, it has been gradually adopted, and to-day in the practice of the majority stands in the front rank of materials for filling teeth when gold is required, either for the entire filling, consolidation, or for giving a hard surface to a non-cohesive gold filling. I have the kindliest feeling for it and other foils as such, but believe that they have not all the properties of the royal metal that may be available for dental purposes.

For some years back I have worked in my laboratory trying to discover some form of gold that might be better even than foils, or at least be a valuable addition to them.

It occurred to me, and the thought is the question of this paper, What is the structural and working difference between gold foil and an entirely new product and new form of gold which I have discovered as the result of many experiments, and which I term crystalline gold? This question I shall try to answer. It is at least partially prerequisite to an understanding of my theory, that the reader should be familiar with the fact that when gold is melted and poured in an ingot it immediately forms a dense mass which has a crystalline structure, readily seen on breaking the ingot. The next process in the manufacture of gold foil is the laminating or rolling of this ingot to a required thickness, during which this crystalline structure is largely destroyed; and when beaten into foil I think it may be said that it is entirely so, as under the microscope the crystalline form that was distinctly seen with the naked eye in the broken ingot, cannot be seen in foils.

The ingot when rolled out into a ribbon has become fibrous, and by further extending it into foil its fibrosity is largely increased; but if not extended more than four grains to the sheet, it still has firmness of continuity that renders it suitable for filling cavities of teeth. These qualities of *continuity and cohesion combined in foils* are just the characteristics in view of which I now proceed to explain the theory, which has resulted in my suggesting that the crystalline structure of my new form of gold is much better adapted to the irregular surface of the dentine than the continuous and bright metallic surface of cohesive or non-cohesive foils.

In filling a cavity with cohesive gold foil the dentist locates a pellet of gold in a retaining-point, and it is firm, and beyond the jar of the mallet or hard pressure; when he attaches another pellet it coheres to the retaining-plug, and so with the remaining pellets until the filling is complete. But often in the process, as he passes away from the retaining-point in building up and condensing the foil about the walls, the half-finished filling has been noticed to move. The grip on the dentine it is his delight to see is wanting, the filling is loose, and he wonders why he loosened it, but the anchorage is still quite firm. Now, may it not be that the bright, solid, fibrous, and continuous metallic surface of the foils is the reason why the failure occurred? From my practical experience and experiments with my crystalline gold I find it is entirely free from any such faults in filling, and there must be a reason for this striking difference of behavior by a different form of the same metal on the same dentine surface.

The following suggestions may help to an understanding of this marked difference between the working of foils and crystalline substances in filling teeth.

I have stated that the crystalline structure has been destroyed in the manufacture of foils, and remark now that each pellet of foil is of one entire piece, crimpled or folded, and when the gold is malleted or pressed home there is an intimate molecular connection throughout this solidified mass. If the pellet was one-eighth inch long or more, there was a close union before the operator began to condense, and he has simply malleted or pressed the air from between the folds or interstices of the pellet of foil ; but owing to the continuous connection of the gold, some taps at one end of the pellet may jar just enough to weaken the close fitting at the other end ; and this may be the real cause of some failures in filling, and why gold "rocks and balls" and leaks.

It is here that the marked difference and behavior of crystalline forms of metallic and mineral materials for filling teeth appears. My crystalline gold is not a continuous body held together and made as are foils, but is a distant crystallization, each crystal slightly cohering being free to move just at the immediate point of the plugger, imbedding itself closely in the dentine without dragging its adjoining crystal, as it also is free to move only as force is applied directly to it, and is then not subject to the adjoining taps as are foils that are in a continuous and fibrous mass.

This important discrimination which I have made as to the behavior of the same metal under different conditions may be, and I think is, entirely new to the profession ; but my theory is not mere speculation, for it is demonstrable in practice, and may be illustrated by the analogous behavior of amalgams. The reason why amalgams are easy to locate in and fill cavities with is because they have a granular form produced by filing. The filings may be coarse or fine, resembling the gold crystalline structure in size, though not in form. When mixed with mercury they are held together by being made "wet" by that liquid metal, just as materials for making bricks are held together by moisture and solidified by heat. There is nothing in mercury or the other metals of which amalgams are composed that has any affinity for dentine.

Then why does an amalgam filling adhere in many cavities from which any other metallic filling would drop? Simply because the density of the mercury and its affinity for the amalgam or some of its component parts, when under pressure, *expels and keeps out the air more perfectly than any other form of liquid;* but the granular structure of the filings under pressure not being of a continuous and fibrous form like foils, the most obscure inequalities of the dentinal surface are reached and gripped since the granules, though bathed with mercury, are still free to move in any direction, and when a part is pressed home the adjoining granules when pressed upon do not drag the others out of position; and so long as the mass remains "wet" or moist with the mercury the adaptation and adherence for a time is perfect,—the mass solidifies, and such fillings remain where no other metallic filling could be made to cling. It is quite common for dentists, when speaking and writing of the changes that an amalgam filling has undergone, to declare that they are owing to the process of "crystallization" under chemical and molecular laws; but they forget or are ignorant of the fact that a SOLUTION of all mineral and metallic substances by water, acids, or heat must be obtained before there can be true crystallization. When picking out an amalgam filling, it is not crystals that are picked out, but the same filings that had been mixed with mercury (resembling burned brick, which is the same clay and sand in grains large or small as they came from the workman's hand, though bruised in mixing). What a nice, clean, and easy process it would be if we could take bars of silver, tin, and platinum, and dissolve them by adding mercury to produce a chemical solution that might result in a perfect crystallization; but as this cannot be done, an amalgam filling is only a solidified mass with some part of the mercury absorbed and wanting,—may be its caloric gone, or some yet undiscovered element that passes off, yet keeps it as a liquid when alone, but will not effect a crystallization.

When my new form of crystalline gold is examined, there will be seen distinct crystals entirely different from any form or precipitates of gold I have yet seen or with which experts are familiar. Under the microscope the remarkable distinction between a simple precipitate and a crystal is distinctly seen, as it has the peculiarly-defined forms that are due to the recognized laws of crystallography. When used in filling cavities, its crystalline structure is the only reason I can assign why it seems to grip the dentine and *never moves as the filling progresses after a small* retaining-point or groove has been made.

Years may yet elapse before the theory herein put forth shall find general acceptance by the dental profession, but to my mind it has long been clear as daylight that indisputable facts concur with scientific principles in affirming the especial adaptation of my crystalline gold to retention by a closer attachment to the structural irregularities of the interior surfaces of dental cavities than any other form of gold.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

(Continued from page 206.)

SECOND SESSION—*Wednesday afternoon, January 15* (continued).

THE PRESIDENT. Dr. Jackson will now make a few remarks on this subject.

Dr. V. H. Jackson, New York. Mr. President and Gentlemen: In continuing the remarks on diagnosis and treatment, and the fallacies of some of the theories of irregularities of the teeth, I will first speak of the influence of the muscles in mouth-breathing.

I am led to believe from the anatomy and histology of the development of the jaws, and from the large number of mouths it has been my fortune to examine and study, of both (the so-called) saddle- and V-shaped arches, that the muscles of those regions play not a small part in connection with other influences that I shall mention, in causing their variation from the normal type of development.

Bones are the frame-work of the body, to which the muscles are attached as stays, and over which the integument is drawn. Tomes says, "The jaws are increased by building bone and process on the outer walls."

I look upon the tissues of the lips, cheeks, and tongue as a matrix that influences to a large extent the form of the arch of the teeth. This view has been advanced by anatomists and histologists for years, and is still maintained by a majority of the profession.

When the tongue is at rest in its natural position within a normal arch of teeth, the anterior part is in contact with the roof of the mouth, and with the lingual side of the teeth of both the upper and lower arches.

It will be observed in the aged, if from early loss of the teeth the process is much absorbed, that when the tongue is at rest the side and end are in contact with the cheeks and lips. In mouth-breathing these tissues not only press unequally on the developing osseous structures, but the tongue is removed from its normal position, being drawn downward, removing the inner part of the matrix from both the upper and lower arches.

As there is a natural tonicity of the muscles even when at rest, we should not underestimate their influence on developing bone. That these structures do tend to influence the curve of the arch and position of the teeth is apparent when one or more teeth have been removed on one side to relieve an over-crowded arch, with the central incisor of the opposite side forced far over the median line, with the perfect arch still preserved. Also, we know that when the wisdom-tooth is erupted toward the cheek, it is gradually drawn by these tissues into its normal position.

An estimate of the influence of the lips, cheeks, and tongue can be understood by their position in the edentulous, and their influence on full plates of artificial teeth where there is much absorption in either the upper or lower. And the influence of contraction of scar-tissue resulting from loss of portions of the soft tissue, which change materially in some cases the form of the process and the position of the teeth, should not be overlooked.

The orbicularis oris is a sphincter muscle. When at rest the lips are closed, and when the mouth is open it and the buccinator are put on the stretch. That these muscles act in harmony is proven by the action of the buccinator while chewing a hard substance on one side of the mouth, when, with each contraction, the lips are drawn toward that side; and anatomy teaches that many of the fibers blend.

I cannot agree with the author of the paper that the influence that the action of the tongue and lips exerts is "due to repeated muscular impulses, rather than a long, quiet pressure," as we merely need to think of the hours of constant traction of the muscles in sleeping with the mouth open, which usually begins early in life while the bones are developing.

Virchow, in speaking of the influence of the muscles on the pelvis when the bones are softened in rachitis, says, "All of these changes are to be attributed to the traction of the muscles and ligaments, as well as to the partial stoppage in the development of bone." I will continue this line of reasoning, but will at this stage hastily consider some of the causes of mouth-breathing, and later trace out some of the relations existing between the maldevelopment of the bones of the nose and maxilla. Mouth-breathing is not a habit, but a necessity, and the occlusion of both nasal fossæ from any cause is capable of making the patient a mouth-breather.

This is to us a very important subject. Why should it not be our duty as dental specialists to direct the attention of parents to the inevitable troubles that will arise if not corrected, if their children are habitual mouth-breathers?

Since enlarged tonsils are so generally referred to by authors as a cause of mouth-breathing, I should not pretend to question. That they do obstruct mouth-breathing I will admit; but that they often obstruct nasal breathing to a great degree I have my doubts. Roberts says, "Enlarged tonsils are found in the rachitic, tubercular, or strumous, and are not congenital, but may first appear at the age of six months to eight or nine years." May not the same systemic conditions that brought about the enlargement of these glands be operative in inducing some of the conditions found in nasal stenosis, which often accompanies them, such as adenoid growth, hypertrophy of the soft tissues, maldevelopment of the bone, etc. ? In reviewing the subject, I am led to the conclusion that the primal cause of nasal stenosis, barring out trauma, is dependent on a constitutional condition, either inherited or acquired. Of these conditions, owing to our limited time, I shall continue to speak only of the rachitic.

Deflection of the nasal septum is to us important : first, because it is considered the cause of a large percentage of the cases of mouth-breathing ; and second, it is so generally associated with the saddle- and V-shaped arch.

Delavan tells us that "a diagnostic sign of an habitual mouth-breather is a high arch and a narrow hard palate, associated with deflection of the nasal septum," and we usually find in these cases a projecting forward of the nasal prominences of the superior maxillary bone.

It is estimated that from thirty to fifty per cent. of European races have more or less deviation of the septum. In the Hebrew race it is found the most marked, and the same writer states that "in the examination of hundreds of specimens of the American Indian it is difficult to find a marked case of deflection." In my examination, however, of a considerable number of skulls in museums, I found that in those from the tribe known as the "Flat Heads" there was a marked degree of deflection.

"The septum is first seen deflected about the seventh year, but the two laminæ do not unite until about the age of puberty."

Dr. Roberts examined one hundred and sixty children from two to ten years old, and found only seven deformities of the septum, four of these with history of injury ; and in a total of seventy-two children between ten and twenty years of age there were found twenty-two deformities. In this report there is no record of the teeth or jaws, but it will be seen from the above statistics that the early deformities of the septum appear at about the time of the eruption of the anterior teeth. Delavan says, "Deflection of the nasal septum proper may be due either to trauma or improper nutrition, usually the latter," and that "palate deformities come from atmospheric pressure, from the occlusion of the nasal passage creating in them, through the act of inspiration, a partial vacuum, and thus disturbing the equilibrium of the pressure upon the upper and lower aspects of the roof of the mouth." We find in this connection that specialists attribute this pressure also as a cause of many of the serious inflammations of the inner ear and Eustachian tube, as well as the membranes of the nose and trouble with the eyes. Deflection of the septum, like the "high vault," is more common in the highly civilized. I am convinced that the larger number of deformities of the nose and jaws in connection with other influences are the result of malnutrition, or, I might say, a degree of rachitis, which is known to be the cause of so many complicated troubles.

The number of cases is increasing, and from year to year the subject of rachitis is receiving more attention from physicians. It is said to be usually traceable to a cachexia or otherwise enfeebled condition of one or both parents. It is most often found, however, that there had been a lack of the vital stimuli, light, heat, air, and food, and the use of food unsuited to the age of the child, lack of phosphorus combinations in the blood, etc., accompanied with retarded, painful eruption, and soft structure of the teeth, with unusual constitutional disturbance during dentition.

Dr. J. Lewis Smith, of New York, who has had a large experience with this disease, states that "it most frequently occurs at the age of one month to five years." Roberts says, "The disease may commence as late as seven or nine years," and Dr. Smith states that "about thirty per cent. of children suffer more or less from it." Another author says that one child in five is affected in good families. The early symptoms are "fretfulness, tenderness on the surface, and perspiration, and later deformity."

We will consider the causes more fully at another time, but will call attention to the experiments of Dr. Heitzmann and others, inducing the disease in animals. It will be observed, as we compare statistics, that there is but a slightly larger per cent. that suffer with deformed septum than are found to have suffered with some degree of rachitis, and also that the majority of the cases of deflection of the septum appear at about the same period as is seen the deformity of the superior maxilla.

Roberts claims that "the flat bones are thickened from periosteal formation, especially near their growing edges, as well as softened." Dr. Henry Green states that "the zone of the cartilaginous tissue which in health is being transformed into bone is very thin, but in rachitis it is greatly increased beneath the periosteum." The alteration of the bones in rachitis, according to Dr. W. Jenner, "consists in an increased preparation for ossification, but an incomplete performance of the process."

Dr. J. Solis Cohen calls attention to "exostosis of the hard palate in connection with the arching of the roof of the mouth." In the high vault this is found more or less marked, and is frequently accompanied with stenosis, and in many cases with a bony ridge either side of the septum, along the line of the suture of the vomer with the superior maxilla.

I want to illustrate by these drawings my idea of some of the general causes of malformation of the jaws and irregularities of the teeth.

In Fig. 1 it will be seen that the distance from the junction of the two maxillary bones to the center of the grinding-surface of the second molar is about the same as the distance from the center of the molar to the line of the outer border of the mastoid muscle. When we consider the action of this powerful muscle, drawing downward on the zygomatic arch, to the anterior two-thirds of which it is attached, and the upward pressure on the maxilla by the combined action of the temporal and masseter muscles, and as we have seen that a large percentage of children suffer with malnutrition, the result of which is that the bones are softened, and, as previously stated, that in connection with the saddle- and V-shaped arch we find the nasal prominences of the superior maxillary bones usually bulged forward, and the palatal process of the maxillary bone thickened and vaulted, and the septum of the nose much deflected, barring out hereditary tendencies, is it not consistent to come to the conclusion that much of the influence is traceable to an early rachitic condition, and that an improved nutrition or degree of health has since been attained?

FIG. 1.

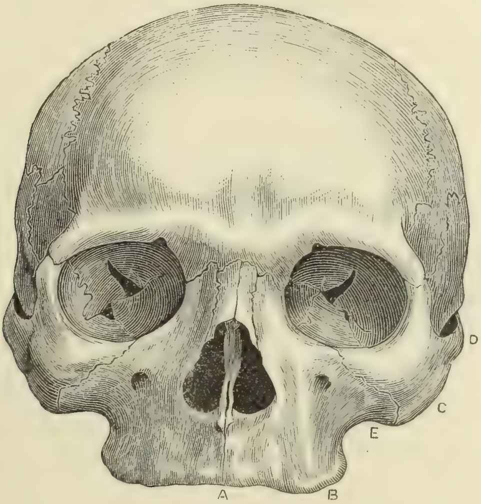


FIG. 1. Drawing from enlarged photograph of skull, with teeth removed after death.—A, junction of the two maxillary bones; B, center line of second molar tooth; C, line of outer border of mastoid muscle; D, outer border of zygomatic arch; E, lowest border of malar process of left superior maxillary bone.

We see teeth daily the soft portions of which mark the extent of development during some acute disease which interfered with bone-nutrition, and wisdom-teeth of poor structure, owing to the lessened nutritive supply during the extensive development of the bony frame. We have in rachitis retarded eruption, painful eruption, a poor quality of teeth, etc.

"Ziem, in his experiments on growing animals to determine the cause of nasal deformities and stenosis, obstructed one nasal orifice, thus withdrawing the normal nutrition and causing an inharmonious development of that one compared with its fellow. There was observed a deviation of the intermaxillary bone and the sagittal suture towards the occluded side, also shortening of the nasal bone, frontal bone, horizontal plate of the palate bone, and flattening of the alveolar process, reduction of the distance between the auditory canal and the alveolar process, as well as between the zygomatic arch and the supra-orbital border."

Fig. 2 represents a drawing of a skull with the malar bone and a portion of the malar process of the superior maxilla removed, exposing the antrum. The frontal sinuses, ethmoidal cells, and a hollowing out of the bone for the antrum of Highmore is first seen about the second year after birth. From that time to full development there is a constant change in the structure; bone is deposited on the outer surface, and an absorption of the inner, although this absorption is slow, and the walls do not reach their normal thinness until after maturity. This is important when we consider the influence of the lateral pressure of the zygomatic arch on the form of the developing maxilla, owing to the inharmonious development of the frontal and other cranial bones.

FIG. 2.

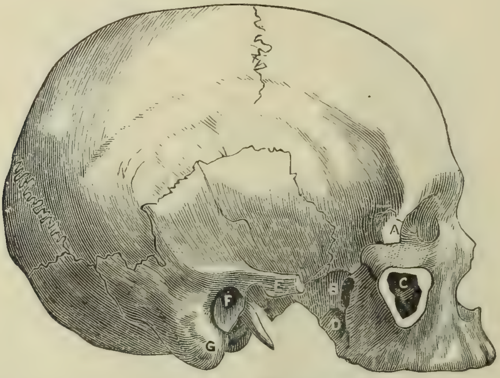


FIG. 2. Drawing from enlarged photograph, with malar bone removed.—A, orbital ridge; B, spheno-maxillary fissure; C, antrum of Highmore; D, Pterygoid process of sphenoid bone; E, temporal portion of zygomatic arch; F, auditory canal; G, mastoid process.

It will be seen that the spheno-maxillary fissure removes much of the posterior support of the maxilla, and that the elongation of the maxilla is by the addition of bone anterior to the pterygoid process of the sphenoid.

In Fig. 3 it will be more clearly seen that the principal growth of the maxilla takes place at the anterior edge of the palate bone, which forms a portion of the roof of the mouth, floor, lateral wall and roof of the nose, and floor of the orbit, and which is attached by suture to the pterygoid process, by the tuberosity or elongated wedge projecting backward into the pterygoid notch of the sphenoid, and that the pterygoid process is practically a fixed point, anterior and near to which all development takes place.

The sphenoid is termed the key to the cranium, as it articulates with all the other cranial bones, and as we examine the skull we find that its lateral growth harmonizes the width to some extent of the posterior portion of the superior and inferior maxillæ ; that of the inferior being governed by the lateral growth of the great wing, increasing the distance between the two glenoid fossæ, and the superior by the great wing and the pterygoid process.

FIG. 3.

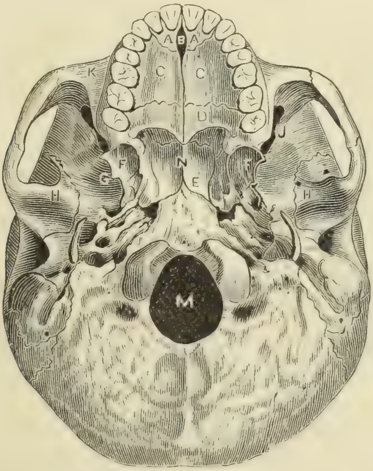


FIG 3.—Base of skull, taken from Gray.—A, intermaxillary bone ; B, anterior palatine canal ; C, palate process of superior maxillary ; D, palate bone ; E, body of sphenoid bone ; F, pterygoid process of sphenoid ; G, great wing of sphenoid ; H, location of glenoid fossa ; J, spheno-maxillary fissure ; K, malar process of superior maxillary ; M, foramen magnum ; N, nasal septum (vomer).

In making the accompanying drawing (Fig. 4) [making drawing in charcoal] I desire to assist in establishing a system of thought by which a clearer comprehension can be had of the time and order of the eruption of the teeth, the progressive stages of development of the maxillary bones after birth, and to assist in illustrating the cause of the change from the normal to the abnormal arch. The normal shape of the arch of a child with temporary teeth in place is first outlined, and the time and order of development of the temporary teeth are then noted. The first permanent molars are then added to the drawing in their respective positions, and the lines representing the anterior border of the malar process of the superior maxilla are extended at the same angle. The lines to represent the posterior border of the palatal bone, malar process, and suture connecting the malar bone are then made, which represent the extent of the growth from the time of the eruption of the second temporary molar to that of the eruption of the first permanent one. The permanent central and lateral incisors are then drawn in position according to the lines of the arch it is intended to represent, in advance of the temporary ones. The first and second bicuspids are then placed in position. These are followed by the insertion of the cuspids, second and third permanent molars, with the proper enlargement of the other portion of the drawing.

Fig. 4.

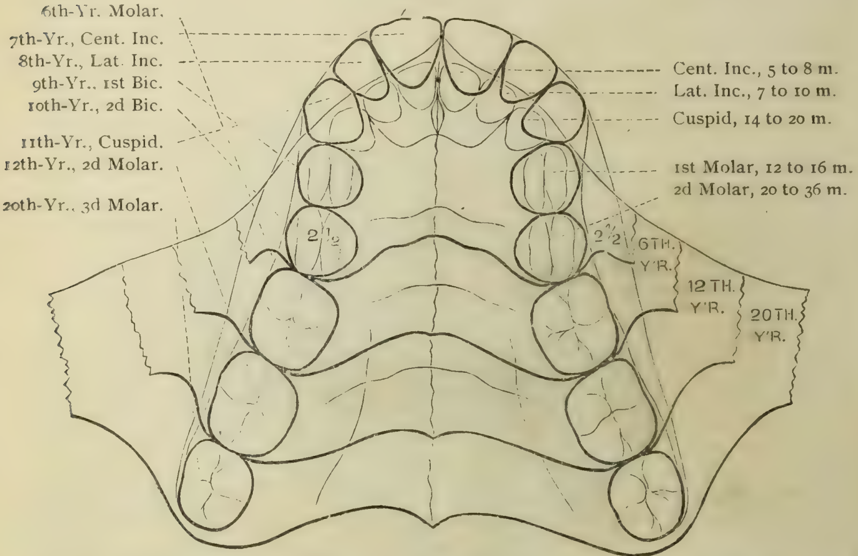


Fig. 4. Photograph of a charcoal drawing made while speaking, to illustrate the progressive stages of normal development, and that of the saddle- and V-shaped arch (of superior maxillary bone?), the time and order of the eruption of the temporary and permanent teeth, etc.

I think we have not as yet given proper consideration to the malformation of the intermaxillary bone and its influence on the superior arch.

It will be observed that the incisive foramen at birth is just posterior to the central incisors, and after all the permanent teeth are erupted it is found some distance from them. This is accounted for by the anterior growth of the intermaxillary bone and process, and in specimens of the V-shaped arch where the superior incisors were much too prominent, it was found a greater distance from them than in either the saddle- or normal-shaped arch.

Tomes says, "The sockets for the lateral incisors occupy a position slightly posterior to those for the central teeth." It often occurs that the time of eruption of the lateral incisor is delayed, and it is erupted somewhat posterior to the central, which is forced forward and either overlaps the opposite one or is forced forward with it, with only the points in contact, which tend to rotate them outward, giving the "V shape," and when the cuspid is erupted it usually forces both incisors to take a still more prominent position. It will be admitted that a large per cent. of the cases with this form of arch is accompanied with mouth-breathing.

The prominences of the malar process extend forward as far as the first temporary molar, and in the adult it is usually seen to shade out as far forward as the second bicuspid. It will be seen that if from any cause there is a lateral pressure on the zygomatic arch, or a lack of development from malnutrition, this process (which is true bone) would tend to press the teeth toward the center of the arch. It is this prominence which remains so full that, in the edentulous after partial or full absorption of the alveolar process, so often interferes with artificial dentures. This also often complicates the operation of spreading the arch, as it does not yield as readily as the alveolar process, and the teeth are forced over it, which elongates them.

In too prominent overcrowded front teeth where it is necessary to extract a bicuspid on each side of the arch, it is my custom to remove a section of the lateral walls of the alveolus (not injuring the sockets), which facilitates the teeth being drawn to position, and I am led to believe that the scar-tissue formed assists in retaining them.

Dr. Talbot. May I ask a question? This is rather a vital point to me, gentlemen, and I want to get it clear. I wish to know if he means to assert that it is the pressure of the muscles that produces the irregularity?

Dr. Jackson. I think the pressure of the muscles undoubtedly has an influence. I have made reference to rachitis as a cause, showing how the bones are softened in the poorly nourished, and consequently easily diverted. I have also spoken of the influence of the muscles, both in the rachitic and in health.

The President. This evening, at eight o'clock precisely, this subject will be continued for a short time, when we will hear from Prof. Truman, of Philadelphia, and Dr. Kingsley, of New York; and the discussion will be closed by Dr. Talbot.

THIRD SESSION—*Wednesday evening, January 15.*

The president, Dr. A. L. Northrop, in the chair.

The President. Prof. Truman, of Philadelphia, will make some remarks upon the paper that was read by Dr. Talbot.

Dr. James Truman. Mr. President, I was very much interested this afternoon in the remarks in regard to this subject, and it seemed to me that the discussion might have ended with the close of the afternoon session, and that I might be spared from the list of speakers this evening. I was not present last evening, consequently I know nothing of the remarks that were made upon that occasion.

In regard to the questions that have been propounded by our friend, Dr. Talbot, I must say it is always difficult to undertake to answer a series of negations; and I felt when I came to look at the propositions that there was really nothing that I could antagonize. The first question that was answered, in regard to sucking of the thumb by children causing irregularity, it seems to me might be classed with the other proposition, breathing with the mouth open, as two of the most absurd theories that have ever been propounded to an intelligent profession, notwithstanding the elaborate statement that was made this afternoon.

When we examine teeth from the period of birth up to the period when thumb-sucking is generally abandoned, I have yet to see any change in the arch produced by that process. Of course we all know that irregularities of the teeth may be produced. But I do not agree with the essayist this afternoon (Dr. Jackson) that the muscles can so act as to produce irregularities upon the jaw to the extent that he described. I cannot realize the possibility, from my conception of the active force contained in those muscles; and if it be true of the permanent teeth, it must necessarily be true of the deciduous teeth,—the same result should be produced upon them; but we do not find it so: at least I am not aware that such a condition exists.

The essayist spoke of the jaws growing smaller, and Dr. Atkinson alluded to it this afternoon. If the jaws are growing smaller, then there comes a time in the history of the development of the maxillæ in which no jaws can exist at all, or else the argument has no force. I do not believe with him that the jaws are really growing smaller. Take a broad view of this whole question, and examine the jaws of people of different races, from the earlier Egyptians, who lived before the erection of the pyramids, down to the present time, and if you can show by that investigation that the jaws of man are lessening in size, then I will agree with you; but I fail to find that, even in comparison with the cave man who lived before the pyramids, the jaws of man have changed except to produce new types from the prognathous jaw that prevailed in the earliest periods of the world's history, and that exists now, perhaps, in certain portions of the earth, in the equatorial regions. In proportion as civilization has advanced there has been a refining process, and from the earlier periods we find a progress toward what I would call refinement. I do not mean a refinement of civilization, but a growth in development. I would illustrate my position in this way: When you examine the animal life previous to the carnivorous era, you find there a condition of coarseness,—not coarseness in the ordinary acceptation, because all tissue is fine in one sense, but a coarseness of growth ; and those of you who are familiar with the comparative anatomy of the teeth know very well that in this earlier period there was a marked difference of development in the structure of the teeth. When we pass from the teeth of the mastodon to those of the elephant, we find there is a great change in the character of the enamel upon them, showing that the flora and fauna of that epoch were entirely different from the flora and fauna of the present period. If this be true,—and you know it is true,—there has been a gradual development and refining process going on. But that does not mean that there necessarily need be a lessening of the jaw by any means. It simply means that there is a change of development, that will eventually, perhaps, produce certain typical forms ; and this brings me to the consideration of the types of the jaws.

When you examine the jaws of various peoples, you find it has taken many series of generations—thousands and thousands of years, perhaps—to develop a type. Those types are pronounced in certain races ; as, for instance, the African has his type, and the German has his, because his is a very old race ; the English have not, in my judgment, a perfect type as yet : they are not old enough ; and the American of to-day has no type at all, and why has he not ? He is a product of dissimilars ; people have come from all portions of the world's surface and settled here ; consequently, as you all know, there has been a mingling of individuals and a breaking up of originals into something that is not strictly a type. We all know, too, that in the process of time the American is developing his own form. We see that in the character of our faces : it is markedly different from that of European races. The same process is going on with the teeth, with the jaws, and with the whole organism ; and eventually the American people will reach an equilibrium and have a type and a jaw that will be peculiar to that people. That is my view of it. But it does not follow therefore that the jaws are growing smaller.

My friend spoke of congenital influences in his paper. He remarks that people are not born with teeth. That is true in one sense, and yet it is not true in another. Teeth are, to a certain extent, developed before birth. The germ of the epithelium that develops permanent teeth lies farther back than birth ; and the process that develops those teeth was laid still farther back than that. We know nothing of the law that covers development and formation ; but we know that there is an active force that differentiates protoplasm and produces certain forms under certain circumstances. This to my mind is very clear, and that behind all this there lies a power that controls the form of these organisms. When you examine the egg of the chick, you know that the differentiation of that protoplasm will produce a chicken, and you know that when the oak acorn falls to the ground the protoplasm therein will produce an oak. But the law that governs this was in force long before that operation was at all perfected.

I do not wish to continue this discussion too long. It has already had too much time given to it. One word in regard to statistics, of which my friend, Dr. Talbot, has collected a large number from various institutions. I think there is danger of fallacy here. In a connection of some twelve years with the Institution for the Blind at Philadelphia, as their professional adviser, I failed to discover that peculiar condition of the jaws that so many speak of. I have not the statistics of this institution by me; but only a small per cent. were congenital cases. The blindness of the remainder was produced by various causes,—disease in childhood, accidents, etc.,—and could not have any effect upon the malformation of the teeth or the peculiar form of jaw described. I am, therefore, forced to the opinion that when conclusions are drawn from these statistics, as a whole, they must necessarily be defective.

The President. I notice that we have with us Prof. Peirce, of Philadelphia, who will occupy your attention for a short time.

Dr. C. N. Peirce. Mr. President, not expecting to be with you this evening until early in the day, I am not prepared to discuss the paper under consideration except in connection with the remarks of the last speaker. I am very sorry not to have heard the previous discussion; however, two or three points have been suggested to which I would like to make a brief allusion.

First, in regard to Prof. Truman's statement about the inability of the muscles to produce narrow arches during the development of the teeth. The deciduous teeth, at the birth of the child, have their crowns already calcified and arranged or permanently fixed in position in the jaw, so that mouth-breathing could not in any way have an influence upon them; but it is quite different with the permanent set. They are coming through gradually while the mouth during the night, and a large portion of the day, is kept open, with the muscles tense upon the sides of the teeth; those of you who have corrected irregularities well know what a slight pressure, when continuous, will produce an impression upon the position of the teeth. I am decidedly of the opinion that mouth-breathing will most emphatically produce a narrow arch and protruding incisors; first, because of the tension of the muscles upon the bicuspids, and next, because the superior lip being elevated, the normal pressure is removed from the incisors. There are two forces acting to produce this irregularity,—abnormal pressure laterally and the absence of pressure anteriorly.

Enlarged tonsils are invariably the cause of mouth-breathing; indeed, I have rarely seen a case of congenitally enlarged tonsils where there was not, with the development of the permanent teeth, a deep, narrow arch, with incisors to a greater or less extent prominent. So frequently is this the case that I should speak of the abnormally developed jaws and teeth as a concomitant variation.

Regarding general irregularities, and the lessening of the size of the jaw, Prof. Truman has said that there are certain *types*, as if those types came without a force or a cause, and became established in one nation or another *de novo*. Every type of tissue is the result of a force that has acted continuously for a time upon that tissue. Any shape or size of the jaw is the result of a mechanical force or its absence. If it can be proven that our diet requires less muscular force to masticate at the present age and in the past century than was required two or three centuries before, necessarily we must have smaller jaws as the result of this diminished exercise of force. I think that principle is illustrated in the African race. Taking those countries where they have lived upon food requiring much muscular force for its trituration, and comparing the jaw thus produced with the jaw of the refined white man in the North or in the South, if you please, whose food has been differently cooked and of a different kind, requiring less force for mastication, we find necessarily a less development of the bones and muscles, and the jaw consequently less in size. When we compare the jaw of the present age with that of centuries ago, or with races that were not refined in their habits of life, we find that in the latter there is plenty of room for the three molars ; indeed, there is a space in them between the third molar and the ramus. This is true of the Hottentots and of the uncivilized races, monkeys, and apes, while in the refined and civilized people whose diet requires less force in mastication you find the third molars crowding, and giving evidence that the jaw is shorter than it was at a former period, oftentimes crowding entirely out of position the third molar. In all these cases of irregularity we must bear in mind the fact that there is a law controlling them, and that law is largely a law of force. There is naturally a constant tendency to variation (this is the law,—no two things alike), and when we see variation to the extent of an irregularity that needs correcting, it is this tendency exalted, and when accompanied by an arrest of development or other abnormalities it may partake of the nature of a monstrosity.

Another law is one that is always working to produce the best result with the least amount of friction. This is also a natural law, or law of nature, affecting moral as well as physical development. With this constant effort, all tissues are in their renewal and development approaching that condition which brings us to a better adaptation of the instrument to the work,—a fulfillment of the law of the "survival of the fittest."

The President. Dr. Kingsley will continue the discussion.

Dr. N. W. Kingsley. Mr. President, I must disagree with the gentleman who made the drawings upon the blackboard this afternoon, so far as the conclusions he drew from the causes presented. I cannot conceive that any muscles in the cheek hold such a power over the jaw as to prevent the teeth from developing all along the line and naturally following out the normal type. If the young man who drew the saddle-shaped jaws had understood the force of the remarks of Dr. Truman he would not have attributed so much to the influence of the masseter and buccinator muscles, or any muscles in the cheek. If they exercise such a power over the jaws as to force them in and prevent development according to the normal type, then I do not see what there is to prevent the saddle-shaped jaw returning to its original saddle shape after it has been spread out. I have treated many such cases, and they have remained without any fixture to secure them, and have not shown a tendency to return to the saddle shape. Therefore it strikes me that if the muscles were strong enough to prevent the normal type of jaw developing, they were strong enough to crowd it back after it had been forced out.

In regard to the remarks made by Prof. Peirce in relation to mouth-breathing and enlarged tonsils, I understood him to say that he had never seen a case of enlarged tonsils where there was not a protrusion of the teeth in the front of the mouth, and he described how it was brought about. Now, I have seen more than one case of enlarged tonsils without such result; and I never saw a case of enlarged tonsils that I could attribute to mouth-breathing. In my own family I had a case of enlarged tonsils until about twenty years of age, and there is no more beautiful shaped arch than is seen in her mouth; it is a perfect and natural development.

I want to particularly call your attention to one statement made in Dr. Atkinson's paper. I don't want a paper of Dr. Atkinson's to go out to the world and be taken as an expression of the views of the First District Society of New York with such a statement as this unquestioned. His statement is this: "No treatment for irregularity of a general character should be commenced before the fifteenth year, nor deferred after the eighteenth." I presume that if Dr. Atkinson and I were discussing this matter privately it would come down to a dispute as to what irregularity of a general character is. I would not hesitate to undertake to correct an irregularity just as early in life as I could determine it was going to be an irregularity. Then nature will help to correct the ill, but the longer you postpone it the worse you are off and the worse your patient is. There are frequently coming into my hands patients of other dentists who have been told they should not have anything done yet; to wait until the child is thirteen or fourteen or fifteen years old ; and the result is that when they come to me I have great difficulty in doing what, if the case had been taken in hand a few years earlier, would have been a very easy matter. Having been neglected so long, it can only be corrected at the expense of much time and trouble and the wearing of a retaining fixture in the mouth at a greater or less risk of harm to the patient. I say get at your regulating work as early in life as the irregularity is developed, and get through with it as quickly as possible ; do not wait until the patient is fifteen years of age if you can get at it earlier.

The President. We will now listen to Dr. Talbot, who will close the discussion of this subject.

Dr. Talbot. Gentlemen, I regret very much that it will be impossible for me, in the short time that remains, to answer all the points that have been brought up in this discussion. I do not want anyone to go away from this meeting supposing for one moment that I would come over here from Chicago and spend a week to present points to this intelligent body which I was unable to prove. I expected to have time and opportunity to show with models, which I have here, that it is impossible for mouth-breathing or thumb-sucking to produce the saddle-shaped or V-shaped arch, or those irregularities which are allied to them. I regret that my remarks to a certain extent have not been plain. I should have said that there are occasionally cases due to thumb-sucking ; but they are so plain and can be so easily diagnosed that it is needless to waste one's time upon the subject.

My friend, Dr. Kingsley, of New York, has kindly and very nicely explained that matter, so it is unnecessary for me to take up your time in that respect. I am gratified and honored that Dr. Kingsley, one of the oldest dentists in the country, and one of the first writers upon the subject of irregularities of the teeth, should agree with me in most of the points that I have made. The remarks of Dr. Truman also pleased me ; and as I agree generally with what he has said, it is not necessary for me to say anything upon those points. I have models to prove that the buccinator muscle cannot produce irregularities of the saddle-shaped and V-shaped varieties.

Two or three gentlemen who have spoken on this subject have kindly said that they did not think my paper was worth the writing. I had an object in writing this paper. If I had come to this meeting with a scientific paper, it would have fallen flat, because in no scientific body can a subject be discussed without having something to combat. So I took for a subject a text with which you all are familiar, and I leave it for you to say whether the discussion has been successful or not. To me it has been perfectly satisfactory.

Dr. Guilford says he does not believe, and does not know of any writer who believes, the high vault and protrusion of the jaw are produced by thumb-sucking. If he will read the Transactions of the Odontological Society, he will find there a paper that Dr. Ballard, of London, read in 1864, in which that point is discussed. This cause is frequently alluded to in our dental societies as producing a high vault.

In discussing the subject of irregularities of the teeth we should not take a single skull to illustrate our points in establishing a type or a general condition, but many skulls. In the study of irregularities of the teeth we should not take one model and draw conclusions from it, we should take many models. We should take the teeth and jaws as well, and go throughout the system and state all the conditions. One man says the V- and saddle-shaped arches are found in idiots, therefore idiocy must be a cause of the saddle- and V-shaped arches; but you have often seen your best men walking down Broadway with such arches, and they are not idiots. In order to understand why the V- and saddle-shaped arches are found among idiots and among the best men in the city of New York, we must know something about general conditions; we must give ten or twelve or twenty years to it. No man should get up in this society and assert a point from one model; he must take many models, and by studying those models he may see the fallacy of the point that I have brought out. It is foolish for a man to get up here and confound the saddle- and the V-shaped jaws, which has been done always in discussions of this kind; and it is done in the text-books; even in the last work of our friend Tomes he speaks of the saddle-shape as a V-shaped conformation. They are two distinct conditions, and are not the result of the same cause.

I regret that I am not able to answer all these points fully. It would take me two or three hours to do so. I thank the gentlemen for coming here and discussing my paper. The discussion has benefited me a great deal.

B. C. Nash, D.D.S., *Secretary.*

(To be continued.)

Dr. Calvin S. Case, of Jackson, Mich., read the following paper in the college lecture-room, at a clinic during the anniversary meeting, illustrating it by models and charts, and demonstrating the method of making and adjusting the apparatus.

THE "ANGLE SYSTEM" IN ORTHODONTIA.

In the operation of correcting irregularities of the teeth the demand for some method by which the system of stationary plates, rubber bands, wedges, and ligatures could be avoided has given rise, within the past few years, to many ingenious contrivances distinctively peculiar in character and well fitted to fulfill almost every demand. So marked and rapid has been our progress in this department of orthodontia that our work of yesterday, with its cumbrous and injurious implements, its tedious, painful, and too often unsatisfactory processes, seems strikingly out of place in recent text-books and periodicals.

Among the most modern methods may be mentioned the "Angle system," which consists in encircling the crowns of teeth with thin bands, to which are soldered short sections of small tubes or "pipes" to act as stays or fulcrums to spring and screw-levers, and final means for holding the teeth in corrected positions until nature has rendered them stationary. The possibilities, advantages, and *modus operandi* of this system have been so fully described by the inventor that special detail at this time would be superfluous. In the hands of one capable of cutting loose from specified means and directions, and sufficiently ingenious to invent and properly construct apparatus for particular cases in practice based upon the principles of this system, I believe it will be found to answer the demands of almost every variety and quality of force by which the desired end may be fully accomplished, with a minimum amount of injury to the tissues, and inconvenience and pain to the patient.

The material and implements which have thus far been put into the market I have usually found insufficient for the most ordinary demands; principally because one's ingenuity is limited to specific means and sizes. In fact, anything else than a quantity of uncut material—leaving the operator to give any desired length or peculiarity, which the case suggests, to his bars, "pipes," jack, traction-screws, and tubes—will, in my opinion, always be inadequate.

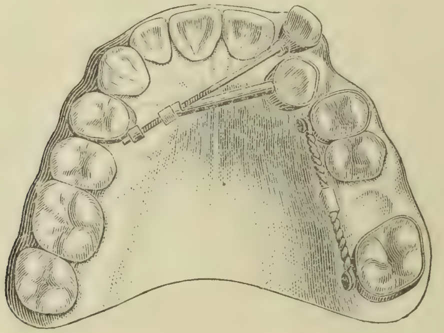
The hope, therefore, of doing something toward placing this system in a position where its value may be more fully appreciated by the dental profession will be the object of my work at this convention.

Dr. Angle has written me that he at first expected all dentists would make their own material and apparatus, and, as I understand it, has only attempted to supply the demands of those who seemed incapable of so doing. As I have seen no printed instruction of how all this material may be made by any dentist of ordinary mechanical ability, I think it will make a not uninteresting or uninstructive demonstration. I shall also attempt to show how the material, after being made, may be fitted into a great variety of regulating appliances, all of which will have general features that are similar within a comparatively small family of resorts, and differ from each other only as the force is made to differ by ingenious variations of the apparatus to meet particular requirements.

The models and drawings which I show, taken from cases in practice, are intended only to illustrate the application of this system; and while some of the contrivances will be found to differ materially from anything hitherto published, no claim for originality is intended, or anything more than will naturally arise in a successful application of the implements.

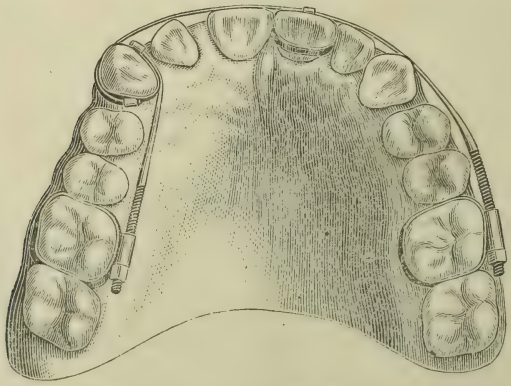
Under this head I call attention to Fig. 1,—better shown on the model,—in which the ordinary Angle jack-screw is cut so that the bar passes through the side of the tube and is made to pull the lateral incisor into the arch, while the counter-force pushes out the inlocked cuspid. The free end of this combination jack-and-traction-screw implement is held in place by the smoothed end of the bar, loosely resting in a pipe attached to the band of an opposite bicuspid, through which it freely passes as the lateral comes into line.

FIG. 1.



Here also is shown an effective traction force produced by twisting a soft silver wire. The wire is looped through holes in a squared button and around lugs soldered to the bands of the teeth to be moved. The ends may be soldered or twisted together, after which the button is gradually rotated.

FIG. 2.



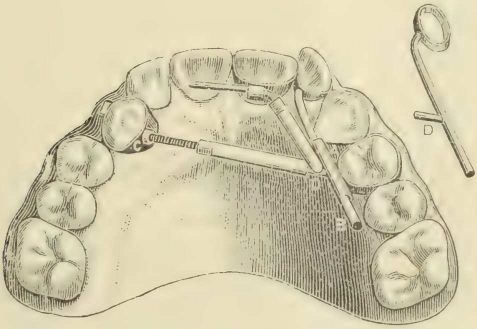
In my own, and especially in the college infirmary practice, the rotating springs suggested by Dr. Angle have not always proven successful. This has led to the adoption, in difficult cases, of a screw force, as shown in Fig. 2 and model. Two small lugs or buttons are soldered to the band on opposite sides of the tooth to be rotated. These are made to engage with the ends of thin bands or wires, which, after passing partly round the tooth, end in screws and anchorages.

This scheme cannot fail to be effective, and what is also quite important, as will be seen in this particular case, it enables one to locate the final position of the tooth.

Fig. 3 (better shown by the model) will serve to illustrate the development of an apparatus which must be studied in order to be fully appreciated.

Soldered to the band of the bicuspid is a section of a split tube (A), forming a trough in which glides a bar (B), one end of which is attached to the band of a malposed lateral incisor. A branch (D) is soldered to the bar upon which rests the end of a short jack, which will force the bar along the trough and draw in the lateral incisor, while the counter-force is exerted against the two centrals, which are tipped slightly in. The end of the branch (D) also engages with another jack which forces out an inlocked cuspid (C) on the opposite side of the mouth. The arch is enlarged to make room for the lateral incisor by the combined force of the two jacks pushing outward the bicuspid and central incisors. The band of the cuspid is supplied with a short pipe on its labial surface, into which a pin will be thrust, locking it in place when in position, and the jack removed. The remainder of the apparatus will give little inconvenience by remaining in the mouth till permanency of position is established.

Fig. 3.



The material which Dr. Angle has finally adopted for this system is almost entirely of German silver, and while it is somewhat difficult to keep the appliances from turning black in the mouth, it possesses many favorable qualities which cannot be duplicated in any other metal.

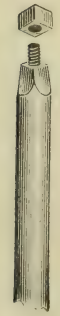
The band material is made of German silver wire, Nos. 15 or 16, English standard gauge, rolled to a thickness of .004 or .005 of an inch. I would suggest that the rollers be so adjusted to give a serpentine shape to the band when it is passed through the last time. This can then be cut into pieces that are more or less crowning, and in consequence more easily adapted to the conical shape of teeth.

Dr. Angle uses only two sizes of German silver wire, which he is particular to have drawn with perfect accuracy to four and five hundredths of an inch in diameter (about Nos. 19 and 18, respectively, E. S. G.); the larger, drawn very hard, for the jack-screws, and the smaller for all traction-screws. The threads are cut, respectively, in Nos. 7 and 4 holes of a Perrilet and Martin's screw-plate No. 36.

The nuts are made of five-cent nickels, which are found to be of proper quality and thickness to be easily cut, and withstand every desired force, while they suffer no oxidation in the mouth that retards them from readily gliding upon the screw. Saw the nickel in halves, and mark it into small squares a little larger than the required size of the nut. These are again cross-marked or punched in the center for a guide to the drill.

The drills (also the tap) I make of Stubb's steel No. 13, E. S. G., to fit hand-piece of dental engine. File down the drill end until it will pass tightly through the desired hole (Nos. 4 or 7) of the screw-plate; in other words, so that its diameter will be equal to the inside diameter of the nut you are about to make. The shank should be slightly constricted, and the twist-shape given with a very small rat-tail file. In tempering, bring the drill end to a cherry-red, plunge suddenly into water or mercury, and draw shank to a light blue. Cut off the length of engine-bit, and shape end to fit hand-piece or lathe-chuck.

Fig. 4.



To make taps, file the steel down to the respective sizes of the screw-bars or wires of even diameter, three-eighths inch from end, and shank constricted same as drill. The thread is now cut in the No. 7 or No. 4 hole of the screw-plate, and the tap tempered as above; after which it is ground three-cornered, tapering slightly toward the end. At the other end of the tap I make a screw the length of the nut, with an abrupt shoulder, and square the shank diagonally the required size of the nut (see Fig. 4). This, when tempered quite hard, will be found a valuable and almost indispensable adjunct to the finishing of these exceedingly small nuts. The instrument should be about five inches long, and handled with a pin-vice.

I have fully described the method of making the drills and taps, because it will be found quite difficult to obtain otherwise instruments of this kind of the required size. And, further, if one will obtain the proper screw-plate and steel, a little practice will demonstrate the fact that they are not as difficult to make as may appear from the description.

The half "nickel" is now secured in the vice and each one of the little squares in the first row is drilled, tapped, sawed off along the marks, and finished as described.

The tubes and "pipes" for the jacks, traction-screws, and rotating wires are made of German silver plate, Nos. 28 to 32, E. S. G., according to the size of the tube you are about to make. Cut into strips a little wider than the required diameter. The edges should be squared or made slightly diagonal, so that when drawn they will form a perfect joint. They may now be partially turned by striking them into a groove in the end of some hard wood or iron, using a piece of the No. 13 steel; after which one end should be tapered and the sides rolled solidly together for about three-fourths of an inch. This will enable you to start the piece through a large hole in a draw-plate (Joubent & Gerante best). Grasping the protruding end with a strong pair of pliers, you will now draw it through one hole and another until the edges of the tube come perfectly together. This operation may be continued until the tube is of the required size.

The tubes for the jacks are drawn quite hard, not requiring to be soldered. The others may be annealed frequently, care being used when soldering the sections to bands and bars to place the joint side next to the soldered surface.

The steel piano-wire used by Dr. Angle is not the large size commonly employed, Nos. 10 or 11 being found amply sufficient.

MISSISSIPPI VALLEY ASSOCIATION OF DENTAL SURGEONS.

THE forty-seventh annual meeting of the Mississippi Valley Association was held in Cincinnati, Ohio, March 5 to 8, 1890.

Dr. J. R. Callahan, president, delivered the annual address. He said forty-six years ago the dentists of this region, realizing the value to be derived from more intimate association, met in convention and formed this society, from which originated the second oldest dental journal and the second oldest dental college in the world. The address closed with a consideration of the future of the society.

Prof. J. Taft said the paper brought many things of the past to his mind. Nearly all of the organizers have passed away. The things done then have an influence upon the profession to-day. They paid much attention to instruments and appliances, and many of the papers, among which are those of Dr. Watt, are valuable to-day.

Dr. James Leslie and Profs. C. M. Wright and H. A. Smith, of Cincinnati; Dr. J. H. McKellops, of St. Louis, and Prof. J. S. Cassidy, of Kentucky, participated in the reminiscences.

After some discussion, a special committee was appointed to act in conjunction with the executive committee to suggest new methods of work for the society.

Dr. Otto Arnold, Columbus, Ohio, read a paper entitled "Non-metallic Plastic Materials for Filling Teeth." Nearly all plastic fillings are non-conductors, therefore are of special use in deep cavities. Oxychloride of zinc should not be used close to the pulp. In all deep cavities oxyphosphate cappings are valuable and indispensable adjuncts in crown-work. Zinc fillings are often inserted, on account of their ease of introduction, where gold should be used.

Prof. J. Taft said he had never used amalgam as a filling-material. Oxyphosphate acts differently in different hands. He had seen an oxyphosphate filling last eighteen years. It should not be used close to the gum nor in approximal cavities. Is one of the very best materials for porcelain inlays. A good oxyphosphate will last as long as an ordinary gold filling. He uses it very often as an intermediate filling-material. Much is due to the manner in which it is mixed ; it should be thoroughly mixed. Some kinds will granulate when used immediately, but if it is kneaded between the fingers it becomes quite plastic, and in that condition is better and easier used. Heat accelerates, while cold retards its setting. Cleanliness is essential in mouths in which there are cement fillings.

Dr. J. R. Callahan asked if either the oxyphosphate or oxychloride hardened the dentine.

Dr. J. S. Cassidy said oxychloride would harden by dehydration. Much depends upon the character of the saliva. Mechanical abrasion has little to do with its failure ; chemical action is the chief cause. More loss takes place in mouths wherein the saliva is vitiated by putrefactive than by fermentative processes.

Dr. H. J. McKellops said if oxyphosphate fillings were inserted in cavities and allowed to remain a year or so, when taken out the dentine will be found very hard and a gold filling may be inserted. It is one of the best materials for filling, and is especially applicable for children's teeth. Eructations from the stomach are very destructive to phosphate fillings. Oxychloride is not the best root-filling, especially in small roots. The mercury of amalgam will render a pulpless tooth very brittle.

Prof. H. A. Smith. Good manipulation is requisite to success in plastic fillings. The components should be thoroughly combined. He has seen a large crown oxyphosphate filling which had been inserted eight years ago in Germany. They were good filling-materials, but had their limitations.

Dr. L. E. Custer, Dayton, Ohio. Before we can understand the action of the oral fluids upon the cement, or the action of the cement upon the tooth-structure, we must first get an idea of what oxyphosphate of zinc is. When the two portions are united, the powder has such an influence upon the fluid as to cause it to crystallize, which in turn incorporates the powder in it. It is a chemical reaction, the liquid changing its form by crystallization and liberating heat, but it is a mixture in so far as the powder does not change its character. It is still oxide of zinc. Having this nature, it is easily acted upon by external agents at the same time the free phosphoric acid acts upon the tooth-structure. He had found that alkalies acted upon cement by neutralizing the acid of crystallization, which liberated the oxide of zinc as a precipitate. Strong acids overpower the phosphoric acid and act upon the oxide, the latter disappearing in the solution. So, as has been said by Dr. Cassidy, we will find a more rapid loss in mouths in which putrefaction is going on, because putrefaction being distinguished from fermentation only by the presence of nitrogen, and, as has been shown by Dr. Watt, one stage in the formation of nitric acid being the formation of ammonia, this disintegrates the cement by neutralizing the acid of crystallization.

Dr. Arnold said he filled roots with oxychloride by using a fiber of cotton on a small broach.

Dr. McKellops said pulp-canals could not be filled with oxychloride of zinc as well as with a solution of gutta-percha ; there was often more than one opening at the apex. He can tell when the gutta-percha has reached the apex by watching the countenance of the patient.

Dr. Gray said he enlarged the canal and filled with iodoform and oil of cassia.

Dr. F. A. Hunter, Cincinnati, said he was never sure that he filled but two roots perfectly, and those were where the gutta-percha appeared at the opening of the sinuses leading from the roots.

Dr. W. H. Sillito, Xenia, asked if it was not the oxychloride of zinc which had the therapeutic effect.

Prof. J. Taft, Cincinnati, read a paper entitled "Inventions and New Things." The protection afforded by patenting an invention has frequently been the occasion of extortion. This was shown by the old rubber patents. The American Tooth Crown Company, by its impositions, has led to the organization of the American Dental Protective Association. This association has been indorsed by dental societies in New York and elsewhere. If the American Tooth Crown Company is not combated, it will override the profession. The Protective Association aims also to protect dentists from many other impositions, such as nostrums, etc. It is proposed to create a commission to examine all inventions and encourage those which are of value, as well as to prevent frauds. These examiners would become experienced, and the inventions which would receive their approval could be received by the profession without much fear of fraud. Their indorsement would be a guarantee of the worth of the inventions, and in that way both the inventor and the profession would be benefited.

Dr. H. J. McKellops said a person who had once taken a license from the American Tooth Crown Company could never avoid taking a license thereafter. Since this is still in litigation, it is better and more economical for a person to take no license, since if he is prosecuted there can only be the back royalty collected,—no back license. He suggests that deans of dental colleges point out these things to the students and bring them up in the way they should go. It is the duty of every dentist loyal to the profession to join the American Dental Protective Association.

Prof. H. A. Smith said he advises his students in those things. The money is safe in the hands of the association, and every cent is accounted for. If you pay and are beaten, there is ten dollars' worth of satisfaction in being on the right side and with the best men of the profession. If you are beaten, you only have to pay the royalty. The Protective Association has the best lawyers in the land, who would protect our rights.

Prof. C. M. Wright read a paper entitled "The Wealth of the Dentist." In computing the wealth of a country, its products, its climate, the morality, intelligence, and thrift of its inhabitants must be taken into consideration. In estimating the wealth of a profession, its morality, ability, intelligence, and thrift form much the greater part. The dentist's capital is not chiefly in his furniture, instruments, and appliances, although the value of these may run up to many thousands of dollars : his principal capital is his skill, integrity, and industry. A dentist is at his best for not more than a fourth of a century ; his best years are between thirty and sixty, and his income is principally received during those years.

A paper by Dr. W. Storer How, entitled "Professional Ethics and Honor," was read by the secretary. The paper, and the discussion that followed, are omitted for want of space.

Dr. L. A. Anderson, V.S., of Cincinnati, gave a short lecture upon Veterinary Surgery and Operative Dentistry, in which he showed by instruments and skulls their methods of practice. He said the veterinary dentist had not kept pace with others. The equine's molars are extracted by trephining at the end of the root, and forcing the tooth out by the mallet and a piece of hard wood resting upon the end of the root. The instruments for this purpose and others are ingeniously contrived. He said as the equine's tooth is worn off it rises from the alveolus, and a molar that has lost its antagonist has frequently to be cut off even with its neighbors.

Dr. James Leslie read a paper on "Crystalline Gold *vs.* Foils."*

Dr. H. J. McKellops exhibited what was said to be the oldest dental work extant; the Weber-Perry engine; the improved Bonwill mechanical mallet; the Darby-Perry excavators and pluggers; the Elliott separator, and a new form of crystalline gold.

Dr. A. S. Billings exhibited a fine molding sand and the Chase metallic combination plate. Dr. L. E. Custer exhibited a reversing action pneumatic plugger. Dr. L. P. Bethel, Toledo, Ohio, showed the Byrnes engine mallet. Dr. M. H. Fletcher, Cincinnati, Ohio, illustrated his system of crown- and bridge-work.†

The Parker furnace, under the direction of Drs. Callahan and Mollyneaux, was shown to be a success. A case was biscuited in seven minutes, and the enamel fused in ten minutes.

The following officers were elected for the ensuing year: Dr. M. H. Fletcher, Cincinnati, Ohio, president; Dr. L. E. Custer, Dayton, Ohio, first vice-president; Dr. Otto Arnold, Columbus, Ohio, second vice-president; Dr. H. C. Matlack, Cincinnati, Ohio, corresponding secretary; Dr. H. T. Smith, Cincinnati, Ohio, recording secretary; Dr. F. A. Hunter, Cincinnati, Ohio, treasurer. Executive committee, Drs. J. R. Callahan, E. G. Betty; Publication, Drs. F. A. Hunter, F. W. Sage, H. T. Smith; Membership, Drs. O. N. Heise, A. G. Rose, C. P. Gray; Ethics, Drs. H. A. Smith, J. Taft, J. S. Cassidy.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

At the annual meeting of the Central Dental Association of Northern New Jersey, held at No. 943 Broad street, Newark, February 20, 1890, the following officers were elected for the ensuing year: A. R. Eaton, president; C. W. F. Holbrook, vice-president; S. S. Hawley, secretary; C. A. Meeker, treasurer; S. C. G. Watkins, C. S. Stockton, George E. Adams, F. B. Luckey, and H. Lyman Clark, executive committee.

Dr. F. C. Barlow presented a resolution indorsing the action of the New Jersey State Society favoring the holding of an International Dental Congress in 1892, and that our society appoint a committee of five, in conjunction with committees from other societies, to formulate plans for the holding of this first International Dental Congress. The resolution was passed, and the following were appointed on this committee: Drs. F. C. Barlow, C. W. Hoblitzell, Harvey Iredell, W. P. Richards, and S. S. Hawley.

S. S. Hawley, *Secretary*, Newark, N. J.

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* See page 281 of the current number.

† A description of Dr. Fletcher's system of crowning will appear in a subsequent number.

THE JAMES TRUMAN DENTAL SOCIETY.

An organization has been formed by the dental students of the University of Pennsylvania under the above name.

The first regular meeting was held on March 13, 1890, and the following were elected officers for the ensuing year: J. A. McKee, Jr., president; Louis Stephan, vice-president; W. T. Arrington, Jr., secretary; and George J. Frey, treasurer.

The society hopes to secure advantages from such association between professor and student, and to open for its members a field for discussion and investigation of such subjects as may be suggested in their course of study. W. T. Arrington, Jr., *Secretary.*

THE SOUTHERN DENTAL ASSOCIATION.

The following list of the committees appointed for the coming meeting of the Southern Dental Association comprises only the names of those who have been heard from, and who have promised papers or to be there and clinic. Many others have been invited whose names will be announced as soon as favorable responses are received.

Committee of Arrangements.—Drs. S. G. Holland, chairman; Wm. Crenshaw, L. D. Carpenter, all of Atlanta, Ga.

Committee on Education.—Drs. V. E. Turner, chairman, Raleigh, N. C.; F. J. S. Gorgas, Baltimore, Md.; J. L. Campbell, Lexington, Va.; A. A. Wofford, Columbus, Miss.; J. P. H. Brown, Augusta, Ga.; R. D. Seals, Fort Smith, Ark.

Committee on Hygiene.—Drs. J. F. Thompson, chairman, Fredericksburg, Va.; H. E. Beach, Clarksville, Tenn.; G. S. Staples, Sherman, Texas; J. B. Hodgkin, Washington, D. C.; W. H. Morgan, Nashville, Tenn.

Committee on Histology and Microscopy.—Drs. A. P. Johnstone, chairman, Anderson, S. C.; W. H. Marshall, Oxford, Miss.

Committee on Pathology and Therapeutics.—Drs. John H. Coyle, chairman, Thomasville, Ga.; G. W. McElhaney, Columbus, Ga.; Geo. Eubank, Birmingham, Ala.; W. H. Eames, St. Louis, Mo.

Committee on Chemistry.—Drs. W. McL. Dancy, chairman, Jacksonville, Fla.; C. E. Kells, New Orleans, La.; J. Hooper, Louisville, Ky.

Committee on Operative Dentistry.—Drs. W. R. Clifton, chairman, Waco, Texas; B. F. Arrington, Asheville, N. C.; Morgan Adams, Sardis, Miss.; E. F. Adair, Harmony Grove, Ga.; O. J. Bond, Chester, S. C.; R. E. Bullington, Memphis, Tenn.; E. P. Beadles, Danville, Va.

Committee on Mechanical Dentistry.—Drs. S. B. Barfield, chairman, Macon, Ga.; C. L. Alexander, Charlotte, N. C.; G. C. Sandusky, Shelbyville, Tenn.; D. Genese, Baltimore, Md.

Committee on Literature and Voluntary Essays.—Drs. L. G. Noel, chairman, Nashville, Tenn.; E. S. Chisholm, Tuscaloosa, Ala.; W. C. Wardlaw, Augusta, Ga.; T. L. Westerfield, Dallas, Texas; H. C. Herring, Concord, N. C.; W. H. Atkinson, New York; J. B. Alexander, Louisville, Ky.; J. T.

Calvert, Spartanburg, S. C.; Jas. Chase, Ocala, Fla.; W. D. Miller, Berlin, Germany; C. B. Johnston, Monroe, La.; D. Hopps, Savannah, Ga.; Arthur C. Hugenschmidt, Paris, France.

Clinics.—Drs. R. K. Luckie, Holly Springs, Miss., superintendent; Syd. P. Hilliard, Rocky Mount, N. C.; A. G. Bouton, Savannah, Ga.; E. Parmly Brown, New York; M. A. Bland, Charlotte, N. C.; B. S. Byrnes, Memphis, Tenn.; E. D. Andruss, Dallas, Texas; G. W. Rembert, Natchez, Miss.; W. H. Richards, Knoxville, Tenn.; C. L. Alexander, Charlotte, N. C.; D. D. Lester, Christiansburg, Va.; B. H. Teague, Aiken, S. C.; W. J. Younger, San Francisco, Cal.; E. Wagner, Montgomery, Ala.; T. S. Waters, Baltimore, Md.; D. Genese, Baltimore, Md.

Committee on Dental Appliances.—Drs. J. S. Thompson, chairman, Atlanta, Ga.; J. Rollo Knapp, New Orleans, La.; H. M. Hunter, San Antonio, Texas.

Committee on Publication.—Drs. B. H. Catching, chairman, Atlanta, Ga.; E. E. Spinks, Meridian, Miss.; M. C. Marshall, Little Rock, Ark.

As some of these committees are not as full as they should be, it is hoped that sufficient replies will be had from those invited to bring them up to a proper standard before the time for publishing the programme.

JOHN C. STOREY, *President.*

DALLAS, TEXAS, February 22, 1890.

DENTAL SECTION OF THE AMERICAN MEDICAL ASSOCIATION.

THE forty-first annual session of the American Medical Association will be held at Nashville, Tenn., on Tuesday, Wednesday, Thursday, and Friday, May 20, 21, 22, and 23, 1890, commencing on Tuesday at 11 A.M.

SECTION OF DENTAL AND ORAL SURGERY.

1. Address. Dr. J. L. Williams.
2. Relation of Tropho-Neuroses to Diseases of the Mouth and Jaws, with special reference to Syphilitic Necrosis. Dr. G. Frank Lydston.
3. How the Vascular Supply is connected with the Teeth. Dr. A. O. Hunt.
4. Vascular Tumors of the Mouth, and Treatment by Injection. Dr. John Marshall.
5. Electro-Therapeutics. Dr. John L. Gish.
6. The Value of Illustration in the Lecture-Room. Dr. McIntosh.
7. Adenoid Growths and their Effect on the Mouth. Dr. E. E. Briggs.
8. Cure of Cleft Palate by a Double-Flap Operation and Closure with the Buried-Tendon Suture. Dr. H. O. Marcy.
9. Diseases of the Gums, and their Treatment. Dr. J. Taft.
10. Irregularities of the Teeth caused by Neurotic Conditions. Dr. Eugene S. Talbot.
11. Hereditary Dental Anomalies. Dr. William S. Sherman.

EUGENE S. TALBOT,
Secretary of Section of Dental and Oral Surgery.

KANSAS STATE DENTAL ASSOCIATION.

THE nineteenth annual meeting of the Kansas State Dental Association will be held at Hotel Throop, Topeka, Kansas, commencing on Tuesday, April 29, 1890, and continuing four days.

Reduced railroad and hotel rates have been granted, and we have promise of a programme of unusual interest. Prominent members of the profession from abroad will be present. All who can meet with us will be cordially welcomed.

C. E. ESTERLY, *Secretary*, Lawrence, Kansas.

NEBRASKA STATE DENTAL SOCIETY.

THE fourteenth annual meeting of the Nebraska State Dental Society will be held at Omaha, Neb., May 20–23, 1890.

H. J. COLE, *President*, Norfolk, Neb.

TEXAS STATE DENTAL ASSOCIATION.

THE tenth annual meeting of the Texas State Dental Association will be held at Belton, commencing on the first Tuesday in May, 1890, and continue its sessions for four days.

There will be a full programme of scientific work, including a large clinic. A cordial invitation is extended to all practitioners of dentistry to attend. CHAS. B. LEWIS, *Secretary*, Dallas, Texas.

IOWA STATE DENTAL SOCIETY.

THE twenty-eighth annual meeting of the Iowa State Dental Society will be held in Dubuque, Iowa, May 6–9, 1890.

A general invitation is extended to members of the profession to be present. GEORGE W. MILLER, *Secretary*, Des Moines, Iowa.

ILLINOIS STATE DENTAL SOCIETY.

THE twenty-sixth annual meeting of the Illinois State Dental Society will be held at Springfield, beginning Tuesday, May 13, and continuing four days. GARRETT NEWKIRK, *Secretary*.

ALUMNI MEETING, PHILADELPHIA COLLEGE OF DENTAL SURGERY.

IN the enumeration of the dental colleges of the United States this one is often forgotten, yet in its brief period of life it made a deep impression on the professional mind, not alone from the high character of the faculty, but in the subsequent active work of its alumni. The latter have for some time had in consideration the necessity of placing this college in its proper niche, and have, therefore, taken the preliminary steps to that end.

This, the third dental college in the United States, had but a short life of four active years, graduating sixty-three regular students. It was organized in 1852, with the following faculty : J. D. White, M.D., D.D.S., Anatomy and Physiology ; Ely Parry, M.D., D.D.S., Chemistry, Materia Medica ; Robert Arthur, D.D.S., Principles of Dental Surgery ; Elisha Townsend, M.D., D.D.S., Operative Dentistry ; T. L. Buckingham, M.D., Mechanical Dentistry ; D. B. Whipple, M.D., Demonstrator of Surgical and Mechanical Dentistry. In 1856 disagreements occurred between the faculty and board of trustees, resulting in the former obtaining a new charter from the legislature of Pennsylvania and the continuation of practically the same school under the name of the "Pennsylvania College of Dental Surgery."

The living graduates of the original college are widely scattered, and it has been thought desirable to bring these into closer union, that the school which gave so many active workers to the dental profession might not sink into oblivion, but should be a recognized factor in the work of the past.

To accomplish this, a meeting was called at Dr. Louis Jack's office, Philadelphia, for February 22, 1890, at which place and time a number of the alumni assembled. Among the number was the venerable professor of anatomy, Dr. J. D. White, the only remaining member of the original faculty. The object of the meeting was stated, and a temporary organization effected by the election of Dr. W. Storer How as president and Dr. James Truman as secretary.

The president announced that a meeting had been called for the 27th of February, but in view of the limited time and the difficulty of getting responses from the alumni, it had been deemed best to call a preliminary meeting for consultation. After full consideration of the whole matter and the importance of effecting a permanent organization considered, it was, on motion, decided to postpone the meeting called for the 27th, until June, 1891, time and place to be hereafter decided upon.

The peculiar position of this college has left the graduates without the protection accorded to other schools, in that their diplomas are not recognized by any State or national board of examiners. The importance of having this settled was apparent, and Drs. Truman and Peirce were appointed as a committee to confer with the National Board of Examiners for the purpose of having this college placed among the list of accepted schools.

Graduates of this school will kindly forward name and address to Dr. W. Storer How, S. S. White Dental Manufacturing Company, Philadelphia.

James Truman, *Secretary.*

SCHEME FOR AN INTERNATIONAL DENTAL CONGRESS.

The following scheme will be submitted to the conference invited by the New Jersey State Dental Society:*

GENERAL.

Each State in the United States, through its societies, to send delegates, and be allowed twenty votes each.

The delegates assembled to elect from among their number a permanent president, vice-president, secretary, treasurer, and an *executive committee of fifty members*, to be divided in sub-committees of finance subscriptions, essays, transportation accommodations, legislation, and other committees necessary in the perfection of plans.

STATES.

Each State and local societies in the State to appoint general State committees of as many members as may be needed, said State committee to elect a working executive committee of twenty members who shall elect a president, secretary, and treasurer, and said committee shall canvass their respective States for subscription papers and exhibits, and they shall be the total number of delegates allowed each State in the general congress committee.

Societies who appoint delegates will please address the temporary secretary,

CHARLES A. MEEKER, D.D.S.,
29 Fulton street, Newark, N. J.

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DENTAL COLLEGE COMMENCEMENTS.

OHIO COLLEGE OF DENTAL SURGERY.

THE forty-fourth annual commencement exercises of the Ohio College of Dental Surgery (Dental Department, University of Cincinnati), were held at the Scottish Rite Cathedral, Cincinnati, Ohio, on Wednesday evening, March 12, 1890.

An address was delivered by Rev. Howard A. Johnston, and an oration by William H. Wernett, D.D.S., of the graduating class.

The number of matriculates for the session was one hundred and sixty-one.

The degree of D.D.S. was conferred on the following graduates, with an address, by James Leslie, D.D.S., of the board of trustees:

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* See DENTAL COSMOS for March, page 235.

NAME.	STATE OR COUNTRY.
Frank Ehret Adams	Ohio.
Benj. Quict Ayres	Ohio.
Edmund G. Beal	Pennsylvania.
Michael A. Becker	Ohio.
Harry R. Bell	Ohio.
Willie M. Bogue	Indiana.
Carl E. Booren	Minnesota.
Homer C. Brown	Ohio.
Stephen A. Brown	Pennsylvania.
D. D. Cunningham	Pennsylvania.
Charlie C. Carle	Ohio.
Wm. J. Crampton	Canada.
Fred. Leslie Cauch	California.
James H. Clark	Ohio.
Herbert E. Crocker	Connecticut.
Isaac Stanton Carter	West Virginia.
J. F. Cope	Pennsylvania.
Jacob J. Donaldson	Pennsylvania.
Sidney A. Donaldson	Kentucky.
Max M. Eble	Kentucky.
Adolph Eicke	Germany.
Bartlett J. Emery	Ohio.
Hampton Geiger	Ohio.
Hugh P. Gillispy	New York.
W. Ohmer Girardey	Ohio.
Wm. Clifford Griffith	Ohio.
Daniel E. Hartwell	Indiana.
W. Howard Hayden	Ohio.
Charles Lee Hill	Ohio.
William H. Houser	Ohio.
Abraham G. Herr	Michigan.
Virgil N. Jones	West Virginia.
William Irwin Jones	Ohio.
Isaac E. Josephis	Pennsylvania.
Atsuhiko Katayama	Japan.
Samuel D. Laughlin	Kentucky.
James W. Leahy	Ohio.
Allen Joseph Lee	Kentucky.
Richard Morgan, Jr	Missouri.
Fermine E. Morgan	Ohio.
John Gilpin Macy	Ohio.
Russell McClanahan	Indiana.
Horace E. McClelland	Ohio.
Thomas H. McClure	Pennsylvania.
James E. Nichols	Canada.
James G. Parr	Ohio.
Clarence C. Pollitt	Kentucky.
J. Harbin Pollock	Ohio.
Adam Burr Purdy	Canada.
Elmer W. Ream	Indiana.
Charles L. Rose	Minnesota.
Frank Stanley Rose	Canada.
Moritz Carl Saul	Germany.
Franklin N. Seeley	Ohio.
Lewis S. Seeley	Ohio.
James Wilbur Shane	Ohio.
Charles F. Shober	Canada.
J. August Shober	Canada.
Albert Sidener	Ohio.
James A. Sinnett	Ohio.
Moses Shobe Smith	Kansas.
Claude H. Thompson	Ohio.
William H. Wernett	Ohio.
Lorne Wilkie	Michigan.
Edwin J. Witherspoon	Michigan.
Bayard A. Wright	Pennsylvania.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE thirty-fourth annual commencement exercises of the Pennsylvania College of Dental Surgery were held at the Academy of Music, Philadelphia, Pa., on Friday evening, February 28, 1890, at 8 o'clock.

The address to the graduates was delivered by Prof. J. Ewing Mears, A.M., M.D.

The number of matriculates for the session was one hundred and eighty-six.

The degree of D.D.S. was conferred on the following graduates by I. Minis Hayes, M.D., president:

NAME.	STATE OR COUNTRY.
R. W. Allan	New York.
G. C. Anthony	Pennsylvania.
A. S. Atkinson	England.
Rupert G. Beale	Pennsylvania.
Edw. V. Beardsley	New York.
J. S. Birdsong	Mississippi.
R. W. Berthel	Pennsylvania.
R. T. Brown	Pennsylvania.
J. H. Burton	Delaware.
A. H. Butterfield	New York.
R. C. Carr	Canada.
Perry R. Chance	Ohio.
Lydia C. Clare	New York.
H. H. Colehower	Pennsylvania.
E. S. Cornell	New York.
Chas. O. Dager	Pennsylvania.
S. S. Davis	Pennsylvania.
I. H. Deacon, D.D.S.	Pennsylvania.
Guillermo Esguerra	U. S. Colombia.
Geo. A. Ewell	Massachusetts.

NAME.	STATE OR COUNTRY.
F. W. Farmer	New York.
Archie G. Fee	Minnesota.
Felix Fischler	Germany.
Benj. Frontz	Pennsylvania.
T. P. Gardner	Kentucky.
M. H. Glocker	Pennsylvania.
C. F. Gorham	Canada.
B. C. Hanington	Canada.
M. P. Harrington	Canada.
W. D. Hays	Pennsylvania.
O. L. Hertig	Pennsylvania.
H. S. Hollenback	Pennsylvania.
Mortimer Hopkins	New York.
W. J. Hottenstein, M.D.	Pennsylvania.
E. K. Hottenstein, M.D.	Pennsylvania.
H. F. Jordan, M.D.	Mississippi.
Gust. Joachim	Germany.
J. D. Kendig	Pennsylvania.
Geo. W. Kesel	Pennsylvania.
B. M. Knight	Virginia.
J. Orr Kyle	Ireland.
W. B. Lake	Pennsylvania.
A. A. Lay	New York.
Edmund Lord	Pennsylvania.
C. H. Lorance	New Jersey.
Carl Lorenz	Germany.
H. T. Martin	Pennsylvania.
J. W. Meisgeier	Pennsylvania.
M. F. Miller	New York.
Martha B. Moore	Pennsylvania.
J. W. A. Musgrove	Canada.
Geo. S. Nason	Nebraska.
Margaret Neilson	New Jersey.
Porter S. Oakley	New York.
W. E. C. Orr	Pennsylvania.
D. W. Peterson	Canada.
G. H. Phelps	Massachusetts.
T. A. Powell	Pennsylvania.
G. H. Rabenold	Pennsylvania.
R. L. Ramsey	North Carolina.
J. D. Ribeiro, M.D.	Brazil.
E. V. Rice	Minnesota.
Benj. F. Rose	Pennsylvania.
W. D. Scholl	Pennsylvania.
E. V. Sheerar	New York.
G. H. Simmerman	New Jersey.
E. H. Slocum	New Jersey.
I. V. Smith	Virginia.
A. J. Timmons	Maryland.
Santiago Uribe	U. S. Colombia.
J. S. Voegtlen	New Jersey.
F. D. Wattson	Pennsylvania.
A. G. Weber	Cuba.
Ignatius R. Weber	Cuba.
J. F. Wessels, Jr	Pennsylvania.
H. C. Wetmore	Canada.

PHILADELPHIA DENTAL COLLEGE.

The twenty-seventh annual commencement exercises of the Philadelphia Dental College were held at the Academy of Music, Philadelphia, Pa., on Thursday, February 27, 1890, at 8 P.M.

The address to the graduates was delivered by Prof. T. C. Stellwagen, M.D., D.D.S., and the valedictory by Frank L. Platt, D.D.S.

The number of matriculates for the session was two hundred and seventy-three.

The degree of D.D.S. was conferred on the following graduates by the president of the board of trustees:

NAME.	STATE OR COUNTRY.
John L. Allen	Maine.
William M. Baker	Ohio.
Henry A. Bary	Pennsylvania.
John E. Banner	North Carolina.
Charles W. Banner	North Carolina.
Lot Bell	Pennsylvania.
Robert A. Baldwin	Massachusetts.
Frank N. Bidwell	Connecticut.
Merle D. Bishop	Pennsylvania.
John E. W. Bissell	New York.
Edgar T. Boyd	Egypt.
George E. Boynton	Maine.
Everet C. Borland	Pennsylvania.
Charles A. Brennan	Pennsylvania.
H. C. Barnhart	Iowa.
George B. Cameron	Canada.
John M. Campbell	Wisconsin.
William A. Capon	Canada.
Irvin A. Chew	Ohio.
Edwin N. Clark	Rhode Island.
Egbert A. Clark	Canada.
Kendall L. Cleaves	Maine.
Amasa F. Conwell	Massachusetts.
Claude A. Conover	New Jersey.
Fred. W. Conover	Iowa.
Chas. A. Coppinger	New Jersey.
Charles A. Darling	Montana.
Oscar Davis	Australia.
Charles Denison	New York.
Bartholomew Dolan	Pennsylvania.
A. James Edwards	Canada.
Ephraim B. Fast	Pennsylvania.

NAME.	STATE OR COUNTRY.
Constantine T. Felt	Pennsylvania.
M. W. Flynn	Massachusetts.
Thomas J. Frazer	California.
Harry V. Frink	Pennsylvania.
Geo. N. Goldthwait	Massachusetts.
Alice A. Graham	Pennsylvania.
Edwin R. Green	Pennsylvania.
Max Greenbaum	Pennsylvania.
George A. B. Hall	Brit. Columbia.
Mark M. Ham	Georgia.
Wm. Booth Hentz	Brazil.
W. A. Heckard	Ohio.
Frank L. Hindle	New Jersey.
Oliver P. Henderson	California.
Charles W. Hodgman	Illinois.
Wm C. Hoffmann	Pennsylvania.
Edwin E. Horning	Canada.
Percy E. Howe	Maine.
Lynn Hoopes	Pennsylvania
George C Hubbel	Connecticut.
S. Grant Hunsberger	Pennsylvania.
J. Fred. Huntington	New York.
Edwin B. Hurd	Ohio.
William H. Jones	New York.
Alvah Johnston	Pennsylvania.
Elis'h A. Kirkpatrick	Montana.
Robert E. Kyle	Wisconsin.
M. F. M. Kelly	Georgia
Albert E. Lester	Australia.
George E. Locke	New York.
Maria Lasser	Pennsylvania.
Daniel Marks	New York.
Henry A. Mansfield	Maine.
Herbert M. Metcalf	Missouri.
William B Minor	New York.
Frank P. Miller	New York.
W. Haliburton Morse	Canada.
Henry A. Moore	New York.
Charles H. Morris	Connecticut.
Robert O. Moorhead	Pennsylvania.
Albert L. Morrison	Rhode Island.
Jos. B. McCaskey, Jr	Pennsylvania.
J. M. McLachlan	Canada.
Jesse B. McBride	Missouri.
J. Sinclair McKay	Canada.
Wm. H. McKerrall	Ohio.
Henry McManus	Connecticut.
David A. MacMullan	California.
Frank Noville	Ohio.
Frank H. B. Parke	Ohio.
Charles G. Pease	New York.
Walter R. Peters	Delaware.
Frank L. Platt	California.
Lawford G. Pullen	Canada.
Percival A. Purdy	Washington.
Charles A. Reed	New Jersey.
Edward E. Richer	Pennsylvania.
Charles B. Rider	Pennsylvania.
C. C. Richardson	Canada.
Felix V. Riviere	Louisiana.
William Lee Ryder	Georgia.
Archibald E. Rykert	Canada.
Harry E. Ruffner	Pennsylvania.
Albert E. Sangster	Canada.
Elmer Sigler	New Jersey.
Andrew J. Senecal	New York.
Albert A. Shaw	Canada.
Sheridan Slocum	New York.
Frederick M. Smith	New Jersey.
George F. Smith	Canada.
D. Sherman Smith	Pennsylvania.
H. F. A. Schmitt	Pennsylvania.
Walter Swazey	Massachusetts.
Richard Stites	Kentucky.
John W. Thomas	Pennsylvania.
Edwin G. Thompson	Canada.
Wm. H. Thompson	NewHampshire
Herbert E. Vaughan	New York.
Paul Voigt	Pennsylvania.
Herbert L. Wheeler	Massachusetts.
Lewis A. Wilbur	Rhode Island.
Samuel C. Wilson	Canada.
J. H. Young	Canada.
J. L. Young	Canada.

NEW YORK COLLEGE OF DENTISTRY.

THE twenty-fourth annual commencement exercises of the New York College of Dentistry were held at Chickering Hall, New York City, on Tuesday evening, March 11, 1890.

The valedictory was delivered by Manly Collard Burns, D.D.S., of the graduating class, and the address to the graduates by Rev. George Alexander, D.D.

The number of matriculates for the session was two hundred and forty-seven.

The degree of D.D.S. was conferred on the following graduates by William T. La Roche, D.D.S., vice-president of the board of trustees :

NAME.	STATE OR COUNTRY.
DeLancy B. Armstrong	New York.
Francisco G. Bruno	Porto Rico.
Alfred Bartels	New York.
Edward H. Babcock	New York.
George W. Baab	New York.
Edwin Betts	New Jersey.
Manly C. Burns	Canada.
Charles E. Baldwin	New Jersey.
Joseph R. Bomann	New York.
Lewis C. Baldwin	New York.
James D. Cook	New York.
Homer C. Croscup	Nova Scotia.
Frank T. Clawson	Illinois.
William G. Clark	West Virginia.
Alfredo Duran	Cuba.
Alfred W. Davisson	New Jersey.
William H. Draper	North Dakota.
Wilbur M. Dailey	New York.
Arthur E. Davenport	Massachusetts
Myron J. Dixon	New York.
William R. Dunster	Russia.
Lewis E. Estler	New Jersey.
Edward Eberle	Connecticut.
Frank W. Eichhorn	New Jersey.
James S. Eckley	Vermont.
George H. Euler	New Jersey.
George A. Fournier	New York.
Charles A. Fones	New York.
Fred. E. A. Faber	Germany.
Ossian L. Field	New York.
Andrew Graham	New York.
Jose G. Gutierrez	Mexico.
Ferdinand W. Griebel	New York.
Francis Gray	Ireland.
Ellis A. Grossman	New York.
George A. Hull	New York.
Chester T. Hustis	New York.
Thaddeus P. Hyatt	New York.
John Julien	West Indies.
Harry C. Kahlo	N. S. W.
Charles B. Kenney	New York.
Roswell De L. King	New York.
Louis W. Kennard	New York.
Hubert A. Lewis	West Indies.
Chas. F. J. Lundgren	Sweden.
James B. Locherty	New York.
Charles C. Linton	Ohio.
Oscar B. Lopez	Louisiana.
William J. Macom	New Jersey.
Otto Mattes	Germany.
Fred. H. Martin	Pennsylvania.
Ferdinand Miller	Germany.
William H. Merritt	Ohio.
Edward O'Neill	Canada.
Nelson M. Pattison	New York.
Stephen Palmer	New York.
Ellis Frank Potter	New York.
George B. Poole	New York.
Louis S. Rosenstice	New York.
Frank A. Ryan	New York.
William A. Rowlands	New York.
Harry J. Sinclair	Pennsylvania.
Julius J. Stier	New Jersey.
Paul Schoenemann	Germany.
William P. Sullivan	New York.
Walter C. Spooner	New York.
Henry A. Spang	Connecticut.
William A. Strong	Connecticut.
Frank R. Stillman	Rhode Island.
Arthur H. Smith	Canada.
William J. Schreiber	New York.
Thomas A. Sproat	Connecticut.
Henry P. Travers	New Brunsw'k
Frank S. Van Nostrand	New York.
John W. Van Doorn	California.
William L. Weed	Connecticut.
Frank E. Weber	New York.
John R. Westervelt	New Jersey.
Horace N. Warren	Iowa.
Julius Zietz	Germany.

CENTRAL TENNESSEE COLLEGE—SCHOOL OF DENTISTRY.

The fourth annual commencement exercises of the School of Dentistry of Meharry Medical Department of Central Tennessee College were held, in connection with those of the medical and pharmaceutical departments, at Masonic Theater, Nashville, Tenn., on Thursday, February 27, 1890.

The address to the graduates was delivered by Rev. J. C. Hartzell, D.D., and the valedictory by D. Green Ferrell, D.D.S.

The number of matriculates for the session was seven.

The degree of D.D.S. was conferred on the following graduates of the dental class by Dr. J. Braden, president of the faculty: D. Green Ferrell, of Texas, and S. James Watkins, of Tennessee.

BALTIMORE COLLEGE OF DENTAL SURGERY.

THE fiftieth annual commencement exercises of the Baltimore College of Dental Surgery took place at Ford's Opera-House, Baltimore, Md., on Thursday, March 20, 1890, at 2 P.M.

The annual oration was delivered by Rev. S. D. Noyes, and the valedictory by U. V. Withee, D.D.S., of the graduating class. The number of matriculates for the session was one hundred and fifty-nine.

The degree of D.D.S. was conferred on the following graduates by Prof. R. B. Winder, dean of the faculty :

NAME.	STATE OR COUNTRY.
J. B. Archer	California.
J. P. Bayon	Louisiana.
T. A. Beal	Pennsylvania.
A. L. Beard	Wisconsin.
J. Noyes Beemer	New York.
J. H. Benton, M.D.	N. Carolina.
H. J. Burkhart	New York.
J. Clarence Busey	Maryland.
A. Foley Butler	Maryland.
J. E. Davidson	Georgia.
C. R. Diffenderffer	Maryland.
H. A. Donaldson	Dist. Columbia
J. E. Dugger	N. Carolina.
J. E. Freeland	N. Carolina.
B. D. Friedenwald	Maryland.
A. H. Goodwin	N. Brunswick.
F. M. Hampton	Alabama.
W. M. Hargrave	N. Carolina.
J. H. Harrington	Kentucky.
C. A. Hews	Maine.
W. E. Holt	New York.
M. H. Hunter	N. Carolina.
W. G. Jankens	Virginia.
L. D. Kelley	Maryland.
R. L. Lamar	Georgia.
J. H. London	N. Carolina.
T. M. Lynn	Iowa.
W. H. Mathews	New Jersey.
H. C. McBrair	New York.
F. L. McGraw	New York.
W. L. Minson	Georgia.
C. W. Minton	Pennsylvania.
W. W. Niles	New York.
J. A. Noll	New York.
H. Ordonez	S. America.
B. M. Oxley	Nova Scotia.
J. E. Parker	California.
J. T. Parker	California.
L. R. Pennington	Delaware.
G. A. Potter	New York.
W. S. Pyle	Maryland.
F. M. Readio	Massachusetts.
R. W. Reese	N. Carolina.
E. H. Reed	Georgia.
H. N. Richardson	W. Virginia.
J. E. Rutledge	S. Carolina.
W. J. Selby	Maryland.
E. O. Sims	Florida.
F. E. Smith	Connecticut.
D. T. Smithwick	N. Carolina.
A. B. Soule	Vermont.
W. H. Spangler	Maryland.
W. M. Spaulding	Minnesota.
W. Sproul	Canada.
H. M. Staire	California.
R. W. Steuart	Indiana.
F. C. Street	Maryland.
A. G. Strickler	Pennsylvania.
J. C. Sutherland	Maryland.
A. Viets	Nova Scotia.
E. H. Webb	S. Carolina.
E. T. White	New Zealand.
J. F. Wilson	S. Carolina.
U. V. Withee	Maine.

MISSOURI DENTAL COLLEGE.

THE twenty-fourth annual commencement exercises of the Missouri Dental College were held, in connection with those of the St. Louis Medical College, at Memorial Hall, St. Louis, Mo., on Thursday evening, March 13, 1890. The valedictory address to the class was delivered by Dr. J. P. Bryson.

The number of matriculates for the session was seventy-eight.

The degree of D.D.S. was conferred on the following graduates by Prof. W. H. Eames, D.D.S., of the faculty :

NAME.	STATE.
William H. Auer	Missouri.
Thomas T. Baker	Illinois.
Walter M. Bartlett	Missouri.
Edward W. Bear	Missouri.
Albert G. Bowman	Louisiana.
Frank H. Caughell	Missouri.
Wm. A. M. Cumming	Illinois.
John E. Deggendorf	Missouri.
Warden B. Dennis, Jr	Illinois.
Peter H. Eisloeffel	Missouri.
Henry D. Field	Missouri.
John W. Forden	Illinois.
Jos. Carter Goodrich	Missouri.
John J. Greer	Missouri.
Edwin C. Hammen	Missouri.
Guilford B. Houston	Missouri.
Frank A. Kimler	Illinois.
Paul W. Keller	Missouri.
Frank M. Lowry	Illinois.
Marcus A. Mace	Illinois.
Peter H. Morrison	Missouri.
Lorenz A. Naumann	Missouri.
Charles W. Ott	Kansas.
Theo. L. Pepperling	Missouri.
Thomas N. Perrine	Illinois.
Harry W. Pierce	Indiana.
James H. Prothero	Nebraska.
Edward Schrantz	Missouri.
Benjamin Q. Stevens	Missouri.
David R. Taggart	Illinois.
Thomas E. Turner	Missouri
Edgar M. Whitsett	Missouri.
Frederick V. Waldron	Pennsylvania.
Francis W. Willard	Illinois.

INDIANA DENTAL COLLEGE.

The eleventh annual commencement exercises of the Indiana Dental College were held at Plymouth Church, Indianapolis, Ind., on Thursday evening, March 6, 1890.

The address to the graduates was delivered by Dr. John R. Clayton.

The number of matriculates for the session was eighty.

The degree of D.D.S. was conferred on the following graduates by Seneca B. Brown, M.D., D.D.S., president of the executive board:

NAME.	STATE.
Ellard D. Bailey	Indiana.
B. C. Brimmacomb	Ontario.
Albert H. Brown	Indiana.
Thomas E. Coffin	Indiana.
A. Moris Coffin	Indiana.
Herbert L. Cormican	Wisconsin.
Leo A. Cox	Minnesota.
Thomas H. Davidson	Indiana.
Charles E. Ervin	Indiana.
Edward G. Fry	Indiana.
Robert B. Gentle	Indiana.
Frank B. Gonzales	Indiana.
Everett H. Green	Minnesota.
John H. Hess	Indiana.
N. F. Hazlett	Indiana.
George E. Hunt	Indiana.
Burton W. Jones	Michigan.
Eldridge H. Keith	Wisconsin.
W. Wallace Mungen	Indiana.
Charles A. Rowand	Indiana.
Roscoe W. Reese	Indiana.
Burt. W. Sober	Illinois.
George W. Tainter	Missouri.
Edward R. Tripp	Wisconsin.
Will L. Tevis	Indiana.
George W. Thompson	Indiana.
Harry B. Tucker	Indiana.

VANDERBILT UNIVERSITY—DEPARTMENT OF DENTISTRY.

The eleventh annual commencement exercises of the Department of Dentistry of Vanderbilt University were held at Watkins Institute, Nashville, Tenn., on the evening of February 25, 1890.

The valedictory on the part of the class was delivered by F. U. Meadows, of Louisiana, and the charge to the class by Prof. W. H. Morgan.

The number of matriculates for the session was one hundred and one.

The degree of D.D.S. was conferred on the following members of the graduating class:

NAME.	STATE.
R. P. Anderson	North Carolina.
J. E. Andrews	Arkansas.
W. D. Anderson	Mississippi.
A. P. Brown	Alabama.
D. F. Bentley	New York.
Crockett Campbell	Louisiana.
J. W. Combs	Texas.
Jas. H. Downie	Michigan.
J. E. Dugger	Louisiana.
Arthur H. Douglas	Michigan.
C. N. Folse	Louisiana.
J. L. Fox	New York.
A. E. Frazier	North Carolina.
F. M. Gillespie	Alabama.
Wm. H. Guess.	Mississippi.
C. L. Gillespie	Tennessee.
Earnest L. Hestle	Alabama.
E. J. Harrison	Louisiana.
W. C. Houston	North Carolina.
J. L. Howard	California.
C. C. Hermann	Indiana.
L. V. Hightower	Alabama.
Jas. W. Jones	Alabama.
Frank C. Johnson	Tennessee.
N. C. Leonard	Tennessee.
F. U. Meadows	Louisiana.
Robert M. Morrow	North Carolina.
Wm. F. Price	Virginia.
J. W. Peden	Tennessee.
J. C. Pearson	Alabama.
J. W. Robson	Texas.
D. F. Robinson	Alabama.
T. W. Smith	Texas.
F. W. Smith	Michigan.
C. S. Shields	Alabama.
T. M. Stowers	Mississippi.
H. H. T. Segrest	Mississippi.
W. H. Stokes	Mississippi.
Chas. H. Taylor	Tennessee.
L. B. Torrence	Missouri.
E. J. Tucker	North Carolina.

UNIVERSITY OF MARYLAND—DENTAL DEPARTMENT.

The annual commencement exercises of the Department of Dental Surgery of the University of Maryland were held at the Lyceum Theater, Baltimore, Md., on Wednesday, March 19, 1890.

The reading of the mandamus was by the dean, Prof. Ferdinand J. S. Gorgas, M.D., D.D.S.; the address to the graduates was delivered by Rev. Elbert S. Todd, D.D., and the class oration by Harvey Edward Glatfelter, D.D.S. The number of matriculates for the session was one hundred and thirty-five.

The degree of D.D.S. was conferred on the following graduates by Hon. S. Teackle Wallis, LL.D., provost of the university:

NAME.	STATE OR COUNTRY.
David Aiken	S. Carolina.
J. Maurice Ayer	N. Carolina.
John R. Berry	Virginia.
William E. Beachley	Maryland.
Wm. C. Boswell, Jr.	Maryland.
Charles T. Breedlove	Arkansas.
Wm. S. Brown, Jr.	S. Carolina.
Oscar Frank Byrd	Virginia.
Stuart Cassard	Maryland.
William H. Collins	Virginia.
St. George T. Craig	Kentucky.
Wray Wythe Davis	Virginia.
L. T. Emerson	Brazil, S. A.
Charles Felker	New York.
Henry J. Fenn	New York.
Isaac Watts Furman	New York.
Harvey E. Glatfelter	Pennsylvania.
Charles C. Graham	Texas.
J. William Graves	Missouri.
N. Robert Hubbard	Pennsylvania.
Aaron V. Huntzbery	Maryland.
W. Spry Hurlock	Maryland.
Robert L. Harley	S. Carolina.
William A. King	Canada.
Daniel O. M. LeCron	Iowa.
John L. Luke	Virginia.
J. Henry Marchant	Virginia.
Otis H. McDonald	Georgia.
James E. McNeal	Maryland.
Thomas P. Meyer	Pennsylvania.
Charles Mezger, Ph.G.	Maryland.
Laurent S. Mitchell	New Jersey.
William W. Morgan	New Jersey.
Charles G. Myers	New York.
George H. Perrin	Canada.
William A. Pressley	N. Carolina.
Charles B. Renoe	Missouri.
Halsey G. Steer	New York.
Sylvanus C. Sykes	Maryland.
F. Foster Todd	Maryland.
Charles B. Whelpley	Canada.
Charles E. Wogan	Pennsylvania.
George Woolsey	California.
Clarence A. Wright	N. Hampshire.

UNIVERSITY OF IOWA—DENTAL DEPARTMENT.

THE eighth annual commencement exercises of the Dental Department of the State University of Iowa took place at the Opera-House, Iowa City, Iowa, on Monday evening, March 10, 1890.

The annual address was delivered by Hon. Robert G. Cousins.

The number of matriculates for the session was one hundred and twenty.

The degree of D.D.S. was conferred on the following graduates by Charles A. Schaeffer, Ph.D., president of the university:

NAME.	STATE.
T. G. Albin	Missouri.
J. V. Anderson	Pennsylvania.
F. J. Bethel	Colorado.
A. D. Barker	Iowa.
Benton Bement	New York.
C. E. Booth	Wisconsin.
C. M. Cobb	Iowa.
C. E. Coleman	Iowa.
G. W. Cook	Illinois.
Charles Dorman	Iowa.
Andrew Dingwell	Iowa.
J. H. Dorival	Minnesota.
F. E. Davoll	Dakota.
J. W. Gluesing	Illinois.
Nathaniel Glasgow	Iowa.
C. H. Gibson	Minnesota.
R. H. Guy Huntley	Iowa.
J. G. Hildebrand	Iowa.
J. W. Hubbard	Iowa.
Harriet M. Jones	Iowa.
W. H. Jallings	Minnesota.
Claude Kremer	Minnesota.
F. B. Kremer	Minnesota.
R. E. Lamoreaux	Nebraska.
F. H. Low	Iowa.
W. B. Mandeville	Minnesota.
Edward Morton	Iowa.
W. F. McDonald	Iowa.
Chas. R. McCandless	Iowa.
W. E. Mabee	Iowa.
G. C. Marlow	Wisconsin.
E. H. Naumann	Iowa.
H. O. Rogers	Iowa.
G. W. Schwartz, M.D.	Nebraska.
S. L. Seeley	Iowa.
Richard Summa	Missouri.
W. H. Simpson	Iowa.
C. D. Tiffany	Iowa.
E. A. Taylor	Iowa.
P. L. Van Winter	Washington.
H. Van Winter	Iowa.
T. B. Wallace	Iowa.
Hattie E. Wells	Iowa.

KANSAS CITY DENTAL COLLEGE.

THE eighth annual commencement exercises of the Kansas City Dental College were held at the Y. M. C. A. Auditorium, Kansas City, Mo., on Wednesday evening, March 12, 1890.

The faculty address was delivered by Prof. C. L. Hungerford, the annual address by Major L. K. Thacher, and the valedictory by R. C. Hutcheson, M.D., D.D.S.

The number of matriculates for the session was seventy-three.

The degree of D.D.S. was conferred on the following graduates by C. B. Hewitt, D.D.S., president of the faculty:

NAME.	STATE.
William S. Barker	Missouri.
Alonzo M. Buckley	Arkansas.
James R. Campbell	Missouri.
Frank L. Ewing	Kansas.
Charles H. Gant	Nebraska.
Samuel M. Gant	Nebraska.
James E. Hawthorn	West Virginia.
Robert C. Hutcheson	Kansas.
Clarence E. Johnson	Kansas.
Shirley S. Millett	Missouri.
Wm. S. McDonald	Indiana.
Frank L. Overstreet	Kansas.
Henry J. Pfister	Kansas.
Carl Ernest Sihler	Indiana.
Charles R. Spruill	Illinois.
Wm. W. Williams	Missouri.

SOUTHERN MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE third annual commencement exercises of the dental department of the Southern Medical College were held, in connection with the medical department exercises, at DeGives's Opera-House, Atlanta, Ga., on Wednesday evening, March 5, 1890.

The annual address was delivered by Rev. Bolling Sasnett, D.D., and the valedictory on behalf of the dental class by Dr. J. C. Cato.

The number of matriculates for the session was sixty.

The degree of D.D.S. was conferred on the following graduates by Dr. Thomas S. Powell, president of the board of trustees :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
H. J. Arbey	Syria.	C. W. Hendry	Georgia.
T. F. Brannan	Georgia.	J. H. Landry	Louisiana.
W. F. Blassingame	Georgia.	E. J. McIver	Georgia.
C. K. Chapman	Georgia.	C. H. Parrish	Georgia.
J. C. Cato	Georgia.	D. Roberts	Georgia.
J. R. Dedge	Georgia.	W. S. Simmons	Georgia.
J. T. Gordon	Georgia.	E. G. Thomas	Georgia.
A. L. Griffin	Georgia.		

HOWARD UNIVERSITY—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of Howard University were held, in connection with those of the medical department, at the Congregational Church, Washington, D. C., on Friday evening, March 14, 1890.

The address to the graduates was delivered by Prof. Charles B. Purvis, A.M., M.D., of the faculty, and the annual address by J. E. Rankin, D.D., LL.D., president of the university. The number of matriculates for the session was thirteen. The degree of D.D.S. was conferred on the following graduates of the dental class :

William M. Ash.
Andrew J. Brown.
Arthur T. Cooper.
Isaac C. Edington.
James H. Holsey.
Robert J. Macbeth.
Geo. A. Thompkins.

COLUMBIAN UNIVERSITY—DENTAL DEPARTMENT.

THE third annual commencement exercises of the Dental Department of the Columbian University were held, in connection with those of the medical department, at Albaugh's Opera-House, Washington, D. C., on Thursday, March 20, 1890, at 2.30 P.M.

The address to the graduates in dentistry was delivered by Prof. H. B. Noble, D.D.S.

The number of matriculates for the session was eleven.

The degree of D.D.S. was conferred on the following graduates by James C. Welling, LL.D., president of the university :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Stephen B. Cassin	Dist. Columbia.	John L. Reid	Dist. Columbia.
Jessie Kappeler	England.	T. W. Stubblefield	Dist. Columbia.
Charles M. O'Leary	Dist. Columbia.		

EDITORIAL.

PATHOLOGICAL DENTITION.

THE average as well as the exceptional influence of primary dentition as a disturbing element is variously estimated. Even when abnormal systemic conditions are admittedly originated or aggravated by a perversion of this physiological process, explanations differ as to the immediate cause of the deranged action. It is assumed on the one hand that the direct pressure of the advancing tooth upon the fibrous integuments is sufficient to account for the disturbance of equilibrium, and that the evidences of such pressure are to be found in local signs,—tumefaction, induration, ulceration, or the whiteness of the presenting tooth. These signs are considered to be the only justification for the employment of the lancet. On the other hand, it is claimed that the most serious and even fatal complications may be due to the irritation of dentition without the existence of local signs. Every observing practitioner must have seen cases in which there was neither redness, tumefaction, induration, nor ulceration of the gums, in which there was not to be seen the whiteness of the presenting tooth, but in which there were, nevertheless, indications of unrest in the child not to be accounted for except on the theory of infantile odontalgia. In such cases investigation fails to find other exciting cause for the restless, peevish, cross, vindictive manifestations ; for the general irritability, the flushed face, the corrugated brow, the compressed lip, the intolerance of light, the disturbed, broken sleep, and markedly for the incessant chewing of the thumb and fingers, as though their introduction into the mouth were an instinctive effort to obtain relief from a local distress. Such indications are accounted for on the theory that it is not the pressure of the advancing tooth upon the gum which causes the distress, but the resistance of the gums to the eruption of the tooth, and the consequent pressure upon the vessels of supply. It is assumed that in such a condition there is produced a hyperemia sufficient possibly to cause a protrusion of the pulp-mass from the incomplete foramen, and which being pressed upon causes the torture of which the child gives evidence. So far as we know this is but a theory,—a theory, however, which seems to be supported by the unmistakable evidences of the relief afforded by a removal of the tension through a free separation of the overlying integuments or of the capsule of the tooth.

In nearly every other supposed cause of death, theories have been verified or disproved by a *post-mortem* examination of the parts involved in the diseased action. In all modern treatises upon disease particular record is made of the anatomical appearances of the involved organs, but so far as we know no *post mortem* has been made in the case of a child whose death was attributed to pathological dentition or to an intercurrent disease concomitant with an apparent perversion of the process of dentition, with a view of ascertaining the exact condition of the dental territory.

Doubtless much light would be thrown on the whole subject by a series of careful observations as to the local *post-mortem* conditions in normal and abnormal dentition, and it seems that such observations would naturally be made by those whose special duty and practice should make them especially interested in such an investigation. There is, perhaps, no subject in the sphere of the dentist more worthy of study, nor one that has received less attention.

PROXIMATE OR APPROXIMAL.

IN the DENTAL COSMOS for February and March, 1880, attention was directed editorially to the want of uniformity among writers for dental periodicals and of dental text-books in the choice of a word to indicate the contiguous surfaces of adjoining teeth. Noting not only this diversity among different writers, we also called attention to the fact that frequently an article would be offered in which the words "proximate," "approximate," "proximal," and "approximal" were used interchangeably, or to convey a slightly modified meaning, as though there was but a shade of difference in their signification. The whole subject was somewhat carefully studied in the light of the definitions of recognized lexicographers, and the articles referred to embraced communications on the subject from Dr. Joseph Thomas, the author of "Thomas's Medical Dictionary," and Dr. Robert Arthur. Recognizing on the one hand the desirability of avoiding a needless multiplication of terms, and on the other hand the importance of exactness of language, and more especially the objection to the use of a term to express an anatomical relation which had already been employed to indicate another and a different anatomical relation, we recommended the adoption by the profession of the single word "approximal" as denoting the contiguous surfaces of adjoining teeth. It was shown that according to Worcester "proximate" signifies "next in the series," and according to Webster "nearest,—next immediately preceding or following," and having no other scientific application, was therefore a better word for the expression of the meaning intended by its use in dentistry than either "approximate" or "proximal." The objections to these were that the former, in its primary signification, "next, nearest," had been superseded by "proximate," and also that its principal use was as a qualifying adjective in chemical and mathematical technology; that the latter term had been already appropriated in medical nomenclature, and had a recognized anatomical significance. To the term "approximal" there seemed to be no objection whatever, as it had not been employed except in the signification which the other words alluded to bore in dentistry, and had the advantage of corresponding in termination with other dental terms denoting position or relation.

When the editorials referred to were written, the term "approximal" was not found in any of the standard general or medical dictionaries, but it has since been incorporated in several prominent lexicons. In the last edition of Thomas's Medical Dictionary it is thus defined: "APPROXIMAL. [From the Lat. *ap* (for *ad*), 'to,' and *proximus*, 'next.'] A term now generally employed to denote the contiguous surfaces of adjoining teeth." In the National Medical Dictionary (Billings) it is defined "Contiguous, next to." In the Supplement to Worcester's Dictionary the following definition is given: "APPROXIMAL, *a*. Approaching:—Specifically (*dentistry*) noting the contiguous surfaces of adjoining teeth."

Our desire being to secure a uniform adoption of the best word, the COSMOS has substituted the word "approximal" for either of the other words noted when occurring in a paper or discussion. We have departed from this rule in Dr. Allan's case in the current issue because of his selection of "proximate" in the title of a formal and carefully-written paper, and his repeated use of that term throughout; but we still believe approximal to be the better word, and would be glad to see its universal adoption as descriptive of the contiguous surfaces of adjoining teeth.

A TESTIMONIAL OF RESPECT.

DR. JOHN ALLEN, of New York, was the recipient of a testimonial of respect from his fellow-practitioners, on Saturday, March 8, in commemoration of the completion of a half-century of dental practice.

A dinner in his honor, at which sixty-four guests were present, was presided over by Dr. W. H. Dwinelle, and addresses were made by Drs. L. D. Shepard, N. W. Kingsley, Frank Abbott, J. W. Clowes, W. H. Atkinson, S. B. Bartholomew, Louis Jack, and others.

Dr. Allen, by his invention of continuous-gum work, conferred a permanent benefit on his profession, and has, moreover, retained for a half-century the esteem and confidence of his brethren. In honoring him the profession honors itself. We hope that the venerable recipient of these expressions of professional regard may live to enjoy for years to come the fruits of his well-earned popularity.

LAID OVER.

In accordance with our custom, we publish in this issue the reports of the college commencements, so far as received. Their insertion necessitates the omission of several articles intended for this number and already in type. These will appear in our next issue.

PUBLISHER'S NOTICE.

It has been our custom to limit "Publisher's Notices" to the first and last numbers of a volume, but we think our readers will be pleased, as we certainly are, with the announcement that the subscriptions for the Dental Cosmos for 1890 have reached a higher figure than ever before in the history of its publication.

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OBITUARY.

DR. JOHN R. RUBENCAME.

Died, in Philadelphia, Pa., August 17, 1889, of heart-disease, John R. Rubencame, D.D.S., in the eightieth year of his age.

Dr. Rubencame was born July 13, 1820, near Stanton, New Castle county, Del. He served an apprenticeship at cabinet-making, then went to St. Louis and enlisted in the Third Missouri Volunteers for the Mexican war, after which he returned to Delaware and engaged in farming for a few years, then came to Philadelphia and studied dentistry under the late Prof. T. L. Buckingham, graduating from the Philadelphia Dental College in 1854. He unaided worked out the principles of manufacturing teeth, and entered into that business in 1857.

Dr. Rubencame married Miss Mary Ball, of Stanton, Del., in September, 1849, and had one daughter; he married, secondly, Miss Mary E. Buckingham in October, 1855, by whom he had one daughter, who died May 22, 1886. He leaves a widow and one daughter. He was a good husband, a loving father, and a kind friend. He was prominently identified with the Masonic fraternity.

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DENTAL LEGISLATION.

DENTAL LAW OF NORTH DAKOTA.

An Act *to Revise and Amend an Act entitled "An Act to Insure the Better Education of Practitioners of Dental Surgery, and to Regulate the Practice of Dentistry in the Territory of Dakota."*

Be it enacted by the Legislative Assembly of the State of North Dakota:

Section 1. That it shall be unlawful for any person who is not, at the time of the passage of this act, lawfully entitled to practice dentistry in this State, pursuant to the provisions of the act of which this act is a revision and amendment, to practice or attempt to practice dentistry in this State, unless such persons shall have first received a license to practice dentistry from the board of dental examiners, as hereinafter provided.

SEC. 2. A board of examiners to consist of five practicing dentists is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act. The members of said board shall be appointed by the governor. The term for which the members of said board shall hold their offices shall be five years, except that the members of the board appointed by the governor pursuant to the provisions of the act to which this is an amendment, residing in North Dakota, and acting as such at the time this act shall take effect, shall hold their respective offices until the close of the term for which they were respectively appointed. The offices of those living in South Dakota are hereby declared vacant and shall be filled as in case of any other vacancy. Any vacancy in said board, whether by removal, death, resignation, or otherwise, shall be filled by the governor. No person who shall be in any manner pecuniarily interested in, or who shall be officially connected with, any dental college or dental department of any school or university, shall be appointed a member of said board.

SEC. 3. Said board shall have power to make reasonable rules and regulations for carrying into effect and maintaining the provisions of this act. It shall choose one of its members president and one secretary thereof, and shall hold regular meetings twice in each year, and such other regular and special meetings as said board may by its rules provide. A majority of said board shall at all times constitute a quorum thereof for the transaction of business, but a less number may adjourn from time to time. The board shall keep full and complete minutes of its proceedings, and of its receipts and disbursement, and a full and accurate list of all persons licensed and registered by said board, and such records, together with the list of licensed and registered dentists, to be kept as aforesaid, shall be public records, and shall at all reasonable times be open to public inspection, and such records, or a transcript of the same, or of any part thereof, under the seal of the board, duly certified by the secretary thereof, shall at all times and places be competent evidence of the facts therein stated or recited. A sworn statement by the secretary, under the seal of the board, stating that any person is or is not a registered dentist, shall be *prima facie* evidence that such person is or is not entitled to practice dentistry in this State. The president of the board and the secretary thereof shall have authority to administer oaths, and the board shall have power to hear testimony as to all matters relating to the duties imposed upon it by law.

SEC. 4. It shall be the duty of every person who, at the time this act shall take effect, is a legally qualified practitioner of dentistry in this State, as shown by the books of registration kept by said board, under the provisions of the act of which this is an amendment, and who is desirous to continue such practice, and of all persons who shall thereafter be licensed by said board to practice dentistry, to procure from the secretary of said board, on or before the thirty-first day of May, 1890, and annually thereafter, a certificate of registration as a practitioner of dentistry in this State. Such certificate shall be issued by the secretary upon payment of a registration fee, to be fixed by the board, which fee shall not exceed the sum of two dollars. All certificates so issued shall expire on the thirty-first day of May in each year, and shall be *prima facie* evidence of the right of the holder thereof to practice dentistry in this State during the time for which they were issued. Any certificate or license granted by said board may be revoked by the board, upon conviction of the party holding it, of a violation of any of the provisions of this act. Every person receiving such certificate shall conspicuously expose the same in his place of business.

SEC. 5. Any person having pursued the study of dentistry in the office, or under the supervision of some regularly practicing dentist, for at least three years before applying for such examination, not lawfully entitled to practice dentistry at the time when this act shall take effect, who shall thereafter desire to practice dentistry in this State, shall appear before said board and be examined with reference to his knowledge and skill in dentistry, and if, upon such examination, such person be found, in the judgment of said board, to possess suitable qualifications to practice dentistry, and if the board shall be satisfied that the applicant has a good moral character, it shall issue to such person a license to practice dentistry in accordance with the provisions of this act. *Provided*, That any person desiring to commence the practice of dentistry in this State, and having a diploma issued or purporting to be issued by any reputable dental college, or dental department of any university, shall present the same to the State board of examiners, and said board being satisfied as to the genuineness of the diploma, and the qualifications of the applicant, shall issue a license to such person to practice dentistry in this State without examination, on payment of the license fee hereinafter provided for. All licenses issued by said board shall be signed by the several members thereof, and be attested by its president and secretary, and the seal of said board.

SEC. 6. Any member of said board may issue a temporary license to any applicant upon the presentation of such applicant of satisfactory evidence that he possesses the necessary qualifications to practice dentistry, on the payment of ten dollars, which license shall remain in force until the semi-annual meeting of said board occurring next thereafter, and no longer; but such license shall not be renewed, nor shall it be granted to any applicant who has, within six months previous to his application, been rejected by said board. Such license shall not be valid until it shall be attested by the secretary of the board, under its seal, and the secretary shall keep a record of such licenses, the date of their issue, and the name of the members by whom each license was issued.

SEC. 7. Any person shall be regarded as practicing dentistry within the meaning of this act, who shall perform upon the human teeth, or parts adjacent thereto, any operation or operations such as are commonly known and designated as dental operations, or operations in dental surgery; or who shall hold himself or herself out, by means of signs, cards, advertisements, or otherwise, as a dentist or dental surgeon. Any legally qualified practitioner of dentistry who has complied with the provisions of this act, or any properly organized and equipped and reputable dental college, or dental department of any reputable school or university, may take into preceptorship a student or students who shall be permitted to perform such operations in the offices or infirmaries of such preceptors and under their immediate supervision, and not otherwise, during the term of three years from the commencement of such pupilage, and no longer, unless for special reasons such time shall, in the discretion of the board, be thereafter extended for a period not exceeding one year. *Provided*, nothing in this act shall be construed to prevent any legally qualified resident physician and surgeon from extracting teeth, or to prevent any person from using any domestic remedy or other proper means for the relief of pain in case of an emergency.

Sec. 8. In order to provide means for carrying into effect and maintaining the provisions of this act, said board of dental examiners may require each person appearing before it for examination as aforesaid to pay said board a fee not exceeding ten dollars, which shall in no case be returned to such applicant; and if the applicant shall receive a license to practice, he shall thereupon pay the further sum of five dollars, which shall entitle him to receive also a certificate of registration as a practitioner of dentistry in this State for the current or registration year in which such license shall be issued, after the termination of which he shall annually obtain a certificate as hereinbefore provided. All moneys received by the board shall be held by the secretary thereof as a special fund for paying the necessary expenses and the compensation of the board and its secretary, as herein provided, and for enforcing the provisions of this act; and the secretary shall give such bond as the board may from time to time require. No part of the salaries or other expenses of the board shall be paid out of the State treasury, but the annual report of the board shall be printed by the State. The secretary of the board shall receive a salary which shall be fixed by the board, in addition to the necessary and legitimate expenses by him incurred in the discharge of his duties, and each member of the board shall receive as compensation the sum of five dollars per day for each day actually employed by him in attending meetings, or in performing any special duty assigned to him by the board, and shall be reimbursed for all legitimate and necessary expenses by him incurred in the performance of any official duty. Said board shall, on or before the first day of December in each year, make an annual report of its acts and proceedings to the governor, which report shall contain, among other things, an accurate statement of all moneys received and disbursed during the previous year.

Sec. 9. Any violations of any of the provisions of this act shall subject the party violating the same to a penalty of not less than twenty-five dollars nor more than fifty dollars for the first offense; of not less than fifty dollars nor more than one hundred dollars for the second offense, and of not less than one hundred dollars nor more than two hundred and fifty dollars for the third or any subsequent offense, and such penalties shall be sued for and recovered in any court of competent jurisdiction in the name of the people by the State's attorney of the county wherein such offense shall have been committed, or in which the offender may be found, and said penalty, when recovered, shall be paid into the common school fund of the county in which the suit shall be brought; and in case of the non-payment of such penalty, the party so offending shall be liable to imprisonment for a period not exceeding six months, in the discretion of the court having cognizance thereof. *Provided*, That either party may appeal in the same time and manner as appeals may be taken in other cases, except that where an appeal is prayed in behalf of the people, no appeal bond shall be required to be filed, whether the appeal be from a justice of the peace, or from the county or district court, or from the appellate court. But it shall be sufficient in behalf of the people of the State of North Dakota, for the use of the board of dental examiners, to pray an appeal, and thereupon an appeal may be had without bond or security. *Provided*, further, That no proceeding shall be commenced against any party for failure to procure the annual certificate of registration provided for in Section 4, until after such party shall have been served with proper notice of such failure, and the penalty thereby incurred. Each operation performed and each patient treated, contrary to the provisions of this act, shall be deemed and held as a separate offense.

Sec. 10. Any person who shall willfully and falsely claim or pretend to have or hold a certificate of license or registration of this board, or of any similar board of any other State, or who shall willfully and falsely, with intent to deceive the public, claim or pretend to be a graduate of or hold a diploma granted by any incorporated dental society or dental college, shall be subject to the penalties provided for in Section 9 of this act, to be sued for and recovered and paid out as in said section provided.

Sec. 11. All laws or parts of laws in conflict with this act are hereby repealed.

Approved February 6, 1890.

THE TEXAS DENTAL LAW.

Following we present the text of the law entitled "An Act to regulate the practice of dentistry in the State of Texas," passed by the legislature of that State last year:

Be it enacted by the Legislature of the State of Texas:

Section 1. That from and after the passage of this act it shall be unlawful for any person to engage in the practice of dentistry in the State of Texas, unless such person has obtained license from a board of examiners duly appointed and authorized by this act to issue such license; provided that dentists who have been in regular practice of dentistry in this State for three years next preceding the passage of this act shall not be required to submit to an examination and shall be entitled to a license without fee, which shall be transmitted to him by mail, otherwise upon his application accompanied by satisfactory evidence to the fact of his having been in the regular practice for the time required.

Sec. 2. That the board of examiners shall be appointed by the judge of each judicial district and shall be composed of three reputable dentists residing in said district, who shall hold their offices two years from the date of appointment, and any vacancy shall be filled by the district judge as aforesaid.

Sec. 3. The board shall, immediately after appointment, select one of their number as president and one as secretary, and adopt all rules necessary for the transaction of the business that may come before them.

Sec. 4. Said board shall meet annually at some central point in their respective districts to conduct examinations and grant licenses; notice of the time and place of such meeting shall be given for one month by publication in some newspaper published in the district.

Sec. 5. Any applicant who shall furnish satisfactory evidence of having graduated and received a diploma from a reputable dental college, and any applicants under the provision of the first section of this act; and all other applicants who undergo a satisfactory examination as to their qualifications, and shall pay to the said board a fee of five dollars, to be used for the advertising and incidental expenses, shall be granted license; which license shall entitle the person to whom granted to practice dentistry in any county when the same has been recorded as required by Section 12.

SEC. 6. Said board shall keep a book in which shall be registered the names of all persons licensed to practice dentistry by said board.

SEC. 7. The book so kept shall be a book of record, and a transcript from it, certified to by the officer who has it in keeping, with the common seal of said board, shall be evidence in any court in this State.

SEC. 8. That two members of said board shall constitute a quorum for the transaction of business, and should a quorum not be present on the day appointed for its meeting, the members present may adjourn from day to day until a quorum be present.

SEC. 9. That one member of said board may grant a license for an applicant to practice until the next regular meeting of the board, when he shall report the fact, at which time such temporary license shall expire, but such temporary license shall not be granted by a member of the board within one year after the board has rejected the applicant.

SEC. 10. That any person who shall, in violation of the provisions of this act, practice dentistry in this State, for a fee or reward, shall be liable to indictment, and on conviction shall be fined not less than one hundred nor more than two hundred dollars ; nor shall it be construed to prevent persons from extracting teeth, nor in any way interfere with physicians and surgeons in their practice as such.

SEC. 11. That all fines collected from prosecutions under this act shall be appropriated to the common school fund in the county where collected.

SEC. 12. That every person to whom license is issued by said board of examiners shall, within thirty days from the date thereof, present the same to the clerk of the county in which he resides, who shall officially record said license in a book in his office, and shall be entitled to demand a fee of fifty cents for his services, but a temporary license issued under Section 9 of this act need not be recorded.

SEC. 13. That on the trial of any person indicted under the provisions of this act it shall be incumbent upon the defendant, in order to exempt him from the penalties of this act, to show that he has authority, under the law, to practice dentistry in this State.

SEC. 14. That all laws or parts of laws in conflict with this act be, and the same are, hereby repealed.

THE MISSISSIPPI DENTAL LAW.

FOLLOWING is the text of an act amendatory and supplemental to an act entitled "An Act to regulate the practice of dentistry in the State of Mississippi," approved February 25, 1882.

SECTION 1. Be it enacted by the Legislature of the State of Mississippi, that from and after the passage of this act it shall not be lawful for any person, whether a graduate of a dental college or not, to begin the practice of dentistry in this State of Mississippi, unless such person shall have first been examined and obtained a license from the "Board of Dental Examiners" duly authorized and appointed under the provisions of an act entitled "An Act to regulate the practice of dentistry in this State," approved February 25, 1882, etc.

Approved February 21, 1890.*

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* For the full text of the Mississippi dental law, see the DENTAL COSMOS for July, 1882, page 386.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

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ORIGINAL COMMUNICATIONS.

STUDIES ON THE ANATOMY AND PATHOLOGY OF THE TUSKS OF THE ELEPHANT.

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THE complete dentition of the elephant is expressed, after Owen,[*] by the formula:

$$i\,\frac{2-2}{0-0},\quad m\,\frac{6-6}{6-6}=28.$$

This includes both the temporary and the permanent teeth, the permanent incisors (tusks) being preceded each by a small temporary one.

The full number of molars developed by the elephant is still a subject of doubt. Ancient writers (Aristotle,[†] Pliny,[‡] etc.) found but four. Gilles[§] (1614) recognized eight: "*Dentes igitur maxillares habet octo contra Plinium qui duntaxat elephanto intus quattuor dentes attribuit.*"

Owen defends the view that there are but twenty-four teeth, against Corse,[||] according to whom there are as many as twenty-eight or thirty-two.

Owen apparently inclines to the opinion that the molars are all to be classed as permanent, none of them being followed by successors to displace them in a vertical direction, but each following the other laterally or horizontally after the manner of true molars. More recent authors, reasoning by analogy from the mastodon, count the first three molars as milk-molars, the rest as permanent. This is, however, a question which does not come within the range of the present communication.

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[*] "Odontography," London, 1840–45.

[†] "Hist. Animal.," lib. ii, cap. 5.

[‡] Lib. xi, sect. 62.

[§] Gillius, "Descriptio nova elephanti," p. 15.

[||] Philosophical Transactions, London, 1799.

Practically speaking, the molars are all deciduous, each being shed in order to make place for its successor; the first when the elephant is about two years old, the fifth probably not before the sixtieth year (Owen). Whether or not the sixth molar is ever shed, and in such case replaced by a seventh, is a point on which there seems to be no certain information.

THE NATURE OF THE MILK-TUSKS.

The tusks, two deciduous and two permanent, being situated in the intermaxillary bones, are classed as incisors, notwithstanding the fact that in form and function they bear so little resemblance to the typical incisor tooth. "The deciduous tusk," remarks Owen, who apparently takes his information directly from Corse, "makes its appearance above the gums between the fifth and seventh month. It rarely exceeds two inches in length and is about a third of an inch in diameter at its thickest part. It is shed between the first and second year."

Corse says, "The first or milk-teeth of the elephant never grow to any size, but are shed between the first and second year, when not two inches in length." He mentions three cases in which the tusks were shed at thirteen, fourteen, and sixteen months respectively. "The tusks which are shed have a considerable part of the root absorbed." Again, "The tusks which are deciduous are perfect and without any hollow in the root, in a fœtus which has come to its full size. The fang is solidified and contracts to its extremity, which is commonly a little bent."

Peter Camper* gives a diagram of a milk-tusk, which accords with these views.

Herman von Meyer† describes the milk-tusk as having a stunted form and limited growth, the crown and root distinctly different; the former is irregular, pea- or bean-shaped, covered with enamel, the latter longer than the crown and contracted toward the extremity (*vid.* Fig. 1).

I have brought forward these various and harmonizing statements regarding the milk-tusks, because we find on the market large numbers of teeth marked milk-teeth which do not at all tally with the description of Owen, Corse, and others. These teeth are from three to sixteen inches long and from three-fourths to one and three-fourths inch in diameter at the base; they are all hollow, sometimes to within an inch of the point of the tooth, *tipped with enamel*, usually more or

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[*] "Description anatomique d'un éléphant mâle."

[†] "Palæontographica," Cassel, 1852, p. 75.

less worn away, and show no absorption of the alveolar portion whatever, nor do they contract toward the base (Fig. 2).

They present externally some similarity to the lower incisor tusks of the hippopotamus, and some of the so-called milk-tusks of the elephant are undoubtedly nothing more than tusks of the hippopotamus. As a rule, however, the longitudinal grooves in the base of the latter are more marked; the tusks are also less curved than those of the elephant, less tapering, fuller, and possess an oblique notch or hollow near the point, produced by friction with the upper incisors.

FIG. 1.

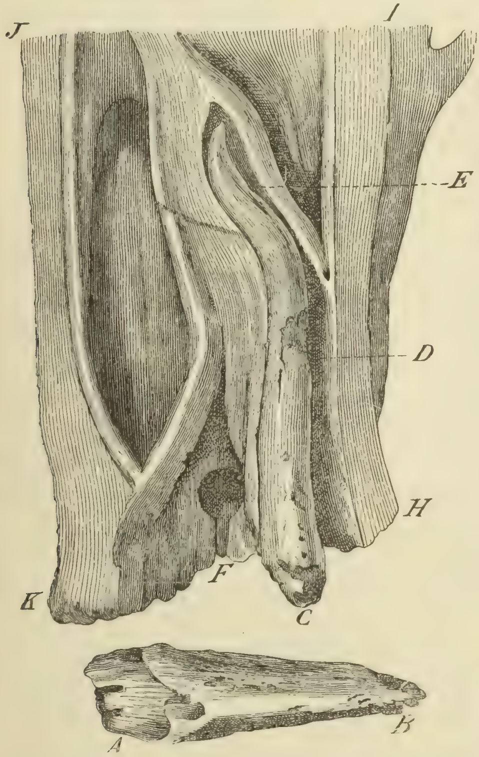

FIG. 1.—H, I, J, K, portion of left intermaxillary bone, with milk-tusk *in situ;* D, beginning of absorption; A, B, milk-tusk after shedding; F, incipient socket of permanent tusk. (After Corse.)

FIG. 2.

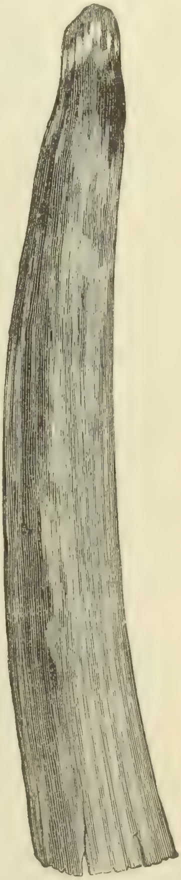

FIG. 2.—Tooth designated by ivory-dealers as milk-tusk of the elephant, one-third natural size. The enamel-tip has been for the most part worn away.

Any doubt which might exist as to whether the so-called milk-tusks under consideration are really elephants' tusks at all is set at rest by sawing through one of them; the cross-section reveals the unmistakable characteristics of ivory, described below.

THE CHARACTER OF THE PERMANENT TUSK AT THE TIME OF ERUPTION.

In accordance with the facts above mentioned the thought is suggested that the permanent tusks of the elephant, contrary to popular belief, must have a coating of enamel at the time of eruption, and that the so-called milk-tusks of ivory-dealers are simply young permanent tusks; a view which Prof. Moebius, whose opinion I asked on this question, pronounced as probably the correct interpretation.

Nevertheless, in order to satisfy myself on this point, I made examination of a number of young elephants and elephant skulls, in all twelve, all of which with the exception of two I found in Hamburg.

In no case of a living elephant did I find enamel on the tip of the permanent tusks. This in all cases examined, except one, might be accounted for by the fact that the constant rubbing of the tusks on the iron bars of the cage would soon wear away the enamel. In the one case referred to, the tusks were only three-fourths of an inch through the gums, still completely protected by the lips, and could not, therefore, have been worn by use. My failure to detect enamel in this case may, I think, be accounted for by an observation, made on the skull of a young elephant, which will be described below.

In the examination of skulls I was more successful. I found in the Museum of Natural History at Hamburg the skull of a four-year-old elephant, having on the right side a tusk 15 cm. long, projecting 2.5 cm. beyond the alveolar border, 4.0 cm. in circumference, and hollow at the base. This tusk possessed a distinct coating of enamel on one side.

After my return to Berlin, Prof. Kraepelin, director of the abovementioned museum, had the great kindness to send me the permanent tusks of a very young elephant (exact age unknown) which proved to be exceedingly interesting.

One of these tusks (Fig. 3, A) had to all appearance not yet broken through the gums, and the point shows no signs of use whatever. This tusk is 14.5 cm. long, 10.0 cm. in circumference at the base, where the wall is as thin as paper, and hollow to within 5.0 cm. of the apex. It possesses a double point, or rather the point resembles two teats, of which one is considerably shorter than the other. *Except near the base, it is enveloped in a thin sheath of a substance which, on microscopic examination, proved to be cement.* The sheath is ruptured in various places, and near the point a piece is broken out, revealing on its under surface a thin layer of enamel. At the base of the tooth the cement is wanting, or, in other words, has not yet been formed.

We find, accordingly, that *the permanent tusk of the elephant at the time of eruption is provided with a coating of cement over its whole surface* (excepting at the base, where the dentine forms somewhat

FIG. 3.

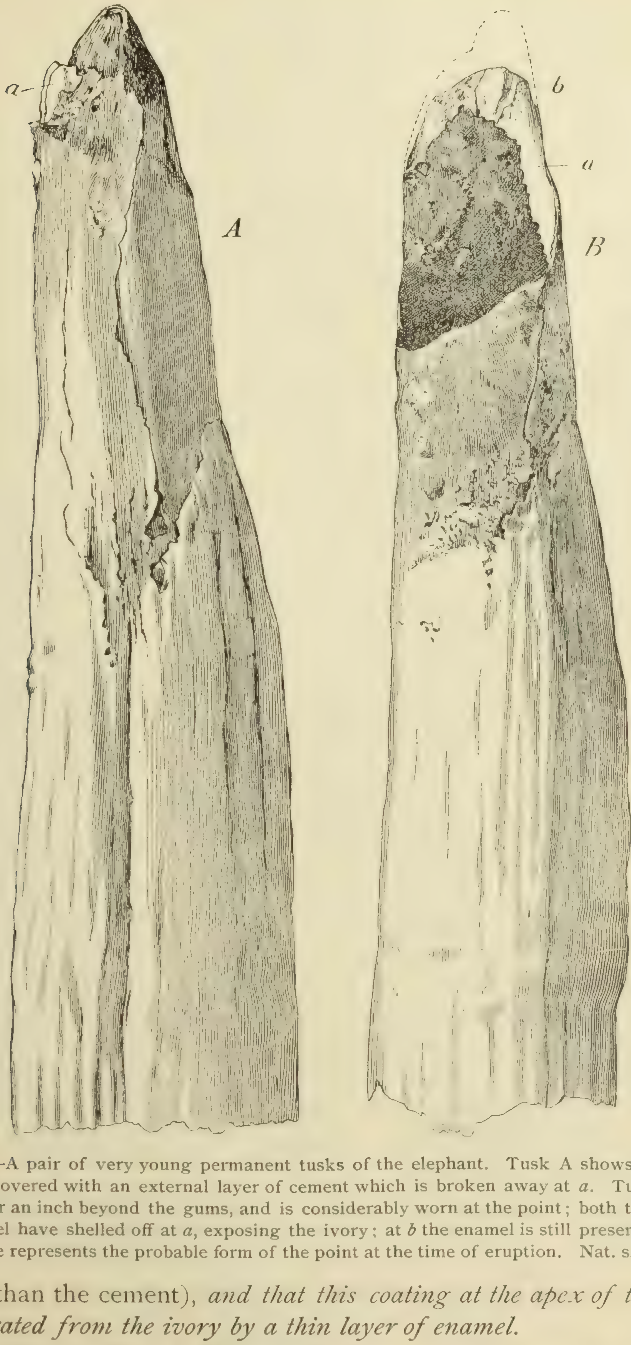

FIG. 3.—A pair of very young permanent tusks of the elephant. Tusk A shows the point unworn, covered with an external layer of cement which is broken away at *a*. Tusk B projected over an inch beyond the gums, and is considerably worn at the point; both the cement and enamel have shelled off at *a*, exposing the ivory; at *b* the enamel is still preserved. The dotted line represents the probable form of the point at the time of eruption. Nat. size.

earlier than the cement), *and that this coating at the apex of the tooth is separated from the ivory by a thin layer of enamel.*

The left tusk (Fig. 3, B) reached about an inch beyond the gums and was considerably worn at the point, so as to expose both the enamel and the dentine. On this tusk the relation of the three tissues is still more easily seen, and is of course the same as that revealed in the opposite tusk.

I have found the same relation of the three tissues on the points of other tusks in my possession; a cross-section of one of them is given in Fig. 4. The layer of cement in very young tusks is one-half to one millimeter thick at the point, and diminishes gradually in thickness toward the base, where it is entirely wanting. The enamel-tip varies considerably in extent and thickness. Its average thickness, according to my observations on a large number of teeth, may be put down at about 0.5 mm.

The fact that very young tusks are provided with a coat of cement may account for my not detecting enamel on the points of the tusks of the young elephant above referred to.

FIG. 4.

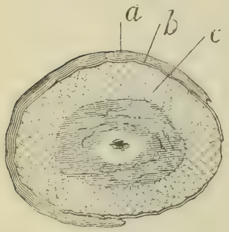

FIG. 4.—Cross-section of a young permanent tusk about two inches from the point, showing a thin layer of enamel between the cement and ivory. *a*, cement; *b*, enamel; *c*, dentine or ivory. The enamel is wanting at the left side, and both enamel and cement are partially broken away at the right side.

The conclusions arrived at by my investigations may be summed up as follows: The tusks of the elephant at the time of eruption are provided throughout with a layer of cement, which, at the apex, is separated from the dentine by a thin layer of enamel, extending to a distance of one and one-half to six inches from the apex.

In looking up the literature of this subject, I find that a similar view was expressed by Hermann von Meyer* in 1852, regarding the structure of the tusks of *Elephas primigenius*.

Also Peale says, "The tusks of the elephant are enveloped by a material whose fibers converge toward the center of the tooth, and which, although less hard than ordinary enamel, is still a kind of enamel" (*vid.* Cuvier, "Annales du Muséum").

Cuvier† although casting doubt upon the accuracy of Peale's observation, still remarks, "It is, by the way, an observation which every one may make on tusks whose surface has not been subjected to use." And Daubenton‡ writes, "The girth of the circumference is sometimes composed of straight transverse fibers, which, if prolonged, would meet at the center."

Camper (l. c.), on the other hand, says of the permanent tusks of the elephant, "*Elles n'ont point d'émail*," a view which is concurred in by Ducrotay de Blainville.* The question of the presence or absence of a tip of enamel on the point of the young permanent tusk of the elephant has accordingly been discussed by various writers, whereas the fact that in the now existing species of the elephant the enamel-tip is itself, at the time of eruption, coated with cement, is here first brought to light.

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* "Palæontographica," Cassel, 1852, p. 75.

† "Annales du Muséum," viii, 1806, p. 300.

‡ Buffon, "Histoire naturelle," xi.

The Tusk of the Adult Elephant.

The permanent tusk makes its appearance soon after the deciduous tooth is shed, and, having a persistent growth, in the male elephant sometimes attains to the enormous length of eight to ten feet, or in rare cases even more, having a circumference at the thickest part of two and one-half feet, and weighing one hundred and fifty to two hundred pounds.

It is more or less curved outward and upward, gradually tapering from the base to the apex, and contains a conical cavity extending to varying distances from the base toward the apex (the pulp-chamber). The cross-section is round or slightly compressed (elliptical).

The tusks are deeply implanted in the intermaxillary bones, reaching to the floor of the nasal cavity, the alveolar portion having in the adult a length of one to one and one-half feet. (See Fig. 5.)

The pulp of the elephant-tusk is an organ of great size, scarcely to be compared with the pulp of the human teeth ; it extends in young animals far into the free portion of the tooth, sometimes occupying as much as seven-eighths of the entire length of the tooth ; its shape in young teeth approaches that of the tusks, being only slightly less tapering.

Fig. 5.

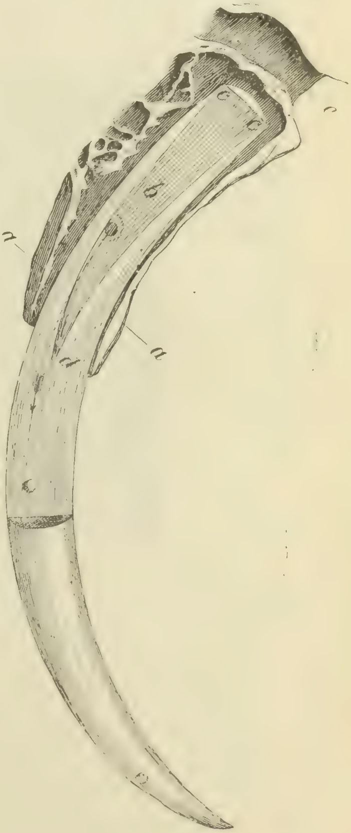

Fig. 5.—Longitudinal section of a tusk with its alveolus. [*a*, alveolus ; *b*, *c*, *d*, pulp ; *e*, nasal cavity. (Part of a drawing after Owen.)

With the growth of the tusk the pulp not only gradually recedes from the apex, but it recedes faster than the whole tooth is shoved forward from the base, so that it actually diminishes in length, and in adult specimens may not extend as far as the border of the alveolus.

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* "Ostéographie" (Elephas), p. 75.

I recently saw an enormous tusk, some eight feet in length, weighing one hundred and sixty-six German pounds, which was practically solid throughout, the pulp-chamber comprising a cup-shaped cavity only five and one-half inches deep.

At the base of the tooth a constant production not only of dentine and cement, but also, at an equal rate, of pulp-tissue, takes place, so that the whole tooth, pulp and all, is bodily pushed forward (or out) in the alveolus. At the same time the pulp-chamber is being gradually filled up by the deposition of ivory over the whole surface of the pulp (on section along the sides *c*, *d*), so that the apex of the pulp *d* constantly recedes from the apex of the tooth.

FIG. 6.

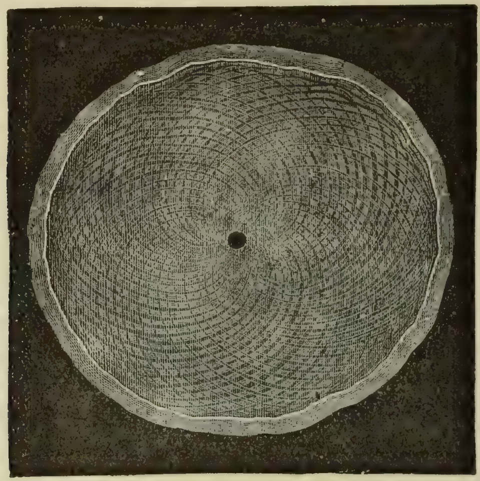

FIG. 6.—Cross-section of a small nearly full tusk, showing the layer of cement, the narrow outer layer of ivory (characterized by a greater degree of transparency), and the decussating curves or spirals.

A cross-section of an elephant's tusk shows to the naked eye an outer thin layer of varying thickness, seldom, however, exceeding four millimeters, of a bony appearance, the cement (Fig. 6). This is succeeded by a more or less pigmented homogeneous layer of ivory, about one to two millimeters in thickness, which presents a scalloped border, corresponding to the longitudinal grooves in the base of the tooth. We observe further, in cross-sections of most teeth, a small number of concentric rings (Fig. 7), through which it has been suggested that the age of the tooth might be determined; they have, however, as we shall see, quite another significance. The center of the section is marked by a black point, surrounded by an irregular whitish opaque spot, which is frequently more or less elongated in the direction of the longer diameter of the section. Ivory-dealers designate this as the beard (Fig. 7). On sections through the growing portions of the tooth a layer of dentine (the latest formed) is clearly marked off by a greater degree of opacity and usually also by a brown color, which latter, however, is probably a post-mortem production. (See Fig. 8.)

FIG. 7.

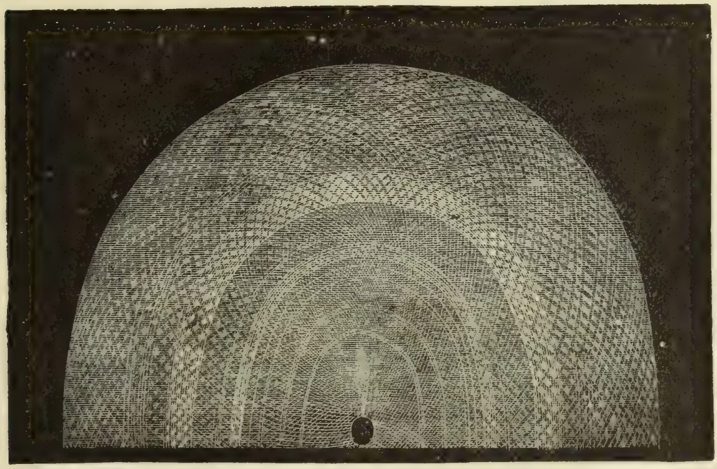

FIG. 7.—Portion of a cross-section from a tusk of medium size, showing (1) the characteristic figures produced by the decussating spirals; (2) a series of concentric rings (strata interlamellaria); (3) the very narrow pulp-chamber and the beard extending from the pulp-chamber in the direction of the greater transverse axis. The cement being entirely wanting (worn off), we infer that the tusk had seen many years of use.

FIG. 8.

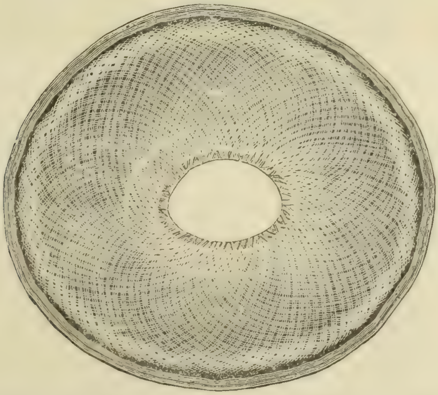

FIG. 8.—Cross-section of a small tusk about three-fourths full, showing the cement, the external layer of transparent ivory, the decussating spirals, one stratum interlamellare, and an inner layer of pigmented ivory surrounding the pulp-chamber.

The body of the dentine or ivory presents appearances characteristic of the tusks of the Proboscideæ, of which the elephant is the only now existing species. Adjacent to the border-line between the cement and dentine, alternating opaque and semi-transparent curved lines or layers are seen to arise, and, passing at first nearly parallel with the periphery of the section, describe curves resembling the spiral of Archimedes, making one-half to three-fourths of a revolution toward the center of the tooth. Of these spirals there are two sets, one passing to the right, the other to the left; crossing each other, they produce, near the border of the cement, elongated diamond- or lozenge-shaped figures; farther beneath the border squares or hexagons, and near the center of the tooth are other diamond-shaped figures, which, however, stand at right angles to those near the border. (See Figs. 6–8.) Of this, which may be considered the normal arrangement, there occur so many modifications that I shall not attempt to describe each one separately. Oblique sections cut at any angle between 15° and 90° show to the naked eye the same appearance as cross-sections, as may be readily gathered from the study of a billiard-ball cut from the heart of the tusk.

FIG. 9.

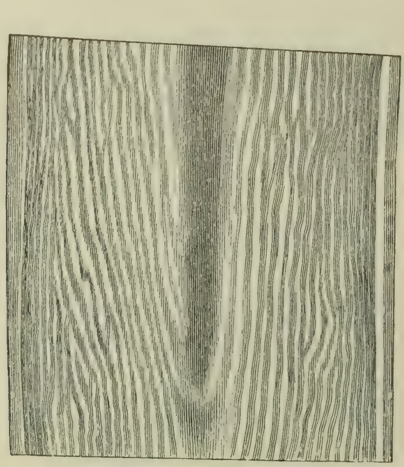

FIG. 9.—Longitudinal section through the center of a full tusk.

Longitudinal sections passing through the heart of the tooth or nearly so present a series of alternating dark and light zones, about one millimeter in thickness, and describing a small angle with the axis of the tooth; that is, they run parallel with the direction occupied by the surface of the pulp at the time they were formed. These zones succeed each other sometimes with tolerable regularity, at other times they run into each other and present frequent ramifications (Fig. 9).

On examining longitudinal sections so made as to cut the tubules at right angles, it will be seen that the light is unequally reflected from different parts of the surface ; thereby are produced appearances which sometimes present a certain resemblance to the figures on moire antique silk ; they are, however, too little pronounced, too inconstant, and vary too much with different specimens to be more nearly described here.

Physical and Chemical Properties of Ivory.

The physical properties of ivory, in particular its hardness and density, as well as its chemical composition, show important differences, depending upon the country or district from which the tusk was obtained. Ivory-dealers distinguish hard, transparent, or glass ivory, obtained chiefly from the west coast of Africa, and soft or milk ivory from the east coast. The quality of the ivory also deteriorates as one recedes from the equator either north or south, the material becoming coarser and less valuable. Furthermore, individual tusks from any district often show peculiarities of structure and color, and even the different layers of one and the same tusk are not always identical in structure, sometimes a transparent layer alternating with a more opaque one.

One cross-section in my possession shows a deep green layer or ring 1.5 mm. in thickness, which, I conceive, must have been occasioned by some peculiarity in the food taken by the animal at the time this layer was forming. A closer investigation into the causes which bring about these differences in the properties of ivory from different districts would be of great interest, and probably throw some light upon the causes of the differences in structure and density of different human teeth. The hard variety has a higher specific weight, and also contains a larger percentage of lime-salts.

I obtained for the specific weight of six different specimens of soft ivory the following numbers : 1.76, 1.75, 1.79, 1.74, 1.78, 1.77 ; mean specific weight equals 1.765 ; and for six specimens of hard ivory : 1.87, 1.82, 1.83, 1.85, 1.84, 1.84 ; mean specific weight, 1.84. Soft ivory dried at 110° C. was found to contain 60.98 per cent. of lime-salts ; hard ivory, 64.44.

We find, consequently, that the hard varieties of ivory not only possess a higher specific weight, but also contain more lime-salts, a result which agrees with the generally accepted notion as to the cause of the difference in the hardness of different human teeth.

Compared with the dentine of the human teeth, ivory is tougher, but decidedly inferior in hardness ; it contains a smaller proportion of lime-salts and has a lower specific weight.

The following table, while making no pretense to absolute accuracy, may serve to give a general idea of the relation of the density of the tissue to the amount of lime-salts :

Substance.	Specific Weight.	Ashes.	Hardness.
Enamel (human tooth)	?	95–97	7
" (elephant's tusk)	?	94.6	7
Dentine (hard)	2.073	72.82	4
" (soft)	2.021	70.16	?
" (milk-tooth)	1.88	67.56	?
Pulp-stone	1.67	65.88	?
Ivory (hard)	1.84	64.44	3.45
" (soft)	1.76	60.98	

It will be remarked that the density, as well as the hardness, increases with the percentage of lime-salts present, dentine being decidedly harder than ivory and enamel harder than dentine ; whereas in regard to toughness exactly the opposite holds true, dentine being tougher than enamel, but in this respect inferior to ivory.

The density of the enamel and dentine of the human teeth has been stated to be seven and four, respectively. I have made no determinations myself, and am not, therefore, responsible for these numbers.

The *comparative* density of dentine and ivory I, however, attempted to determine by the following method : With an ordinary spear-pointed drill, driven by the dental engine, under a pressure of a one-pound weight, six holes were bored in a piece of ivory, giving eight revolutions of the driving-wheel to each hole. In like manner, with the same drill, six holes were made in a piece of dentine. The holes in the ivory were very evidently deeper than those in the dentine. The borings collected and dried at 110° C. weighed in the case of the ivory 0.014, in the case of the dentine 0.012. This method may, I believe, give tolerably reliable results for substances whose hardness is not too nearly equal to that of the drill.

Again, holes bored in the manner above described were filled with amalgam, and the amalgam then removed and weighed. For four holes bored in dentine at right angles to the longer axis of the tooth I obtained the average weight 0.023, and for an equal number of holes in ivory, made parallel with the long axis of the tusk, 0.0265, from which I computed the density of ivory at 3.45. This value is but approximate, since different specimens of ivory differ appreciably in hardness.

It is also worthy of remark that the hardness of ivory, as determined by the above method, is very considerably greater in the direction of the length of the tusk than in a direction at right angles to it. It might be worth the while to determine whether this is the case with human dentine also.

(To be continued.)

THE DECOMPOSITION OF THE CONTENTS OF THE DENTINAL TUBULES AS A DISTURBING FACTOR IN THE TREATMENT OF PULPLESS TEETH.

BY W. D. MILLER, PH.D., D.D.S., BERLIN.

IN many of the recent discussions on the treatment of pulpless teeth or teeth with foul pulps, particular stress has been laid upon the supposed necessity of pursuing such a course of treatment as will bring about a complete sterilization of the contents of the tubuli in the dentine of the root. It has been claimed that otherwise decomposition of such contents will follow, gases and other products of putrefaction will work their way through the dentine and cement and keep up a perpetual bombardment upon the pericementum, resulting in chronic or possibly acute inflammation of the same.

These claims do not appear to me to be in accord with clinical experience, nor are they, as far as my knowledge of the literature of the subject goes, based upon experimental evidence. It has been my experience that in all cases where we have a straight wide canal, so that we can remove all traces of the pulp and thoroughly cleanse the canal, regardless of the tubuli, we may count upon success with almost, if not quite, absolute certainty.

In proportion as the canal becomes narrower and tortuous, rendering the thorough cleansing difficult or impossible, in the same degree the probability of a successful treatment will be diminished. It is a matter of continual experience that an inflammation of the pericementum, either acute or chronic, will disappear with astonishing rapidity upon the total extirpation of the putrid pulp and application of almost any antiseptic, which would scarcely be the case if the decomposition of the contents of the tubuli were an important factor in the disturbance. Again, in all cases where trouble has arisen after treatment I have been able to trace it either to irritation of the periapical tissue by careless treatment or over-treatment, or to an imperfect cleansing of the canal.

What, however, from a clinical aspect seems to tell most strongly against such a view is the fact that trouble subsequent upon filling occurs invariably first at the point of the root, where it may remain localized or spread to a greater or less portion of the pericementum, whereas any trouble arising from the decomposition of the contents of the tubuli we should expect to begin near the neck of the tooth, where the decomposition must first take place, if at all, and where, on account of the thinness of the cement, the gases might most easily penetrate to the pericementum.

Dr. N. S. Jenkins (Dresden) expresses himself upon this subject as follows: "It is my conviction that no inflammation of the pericementum takes place when the pulp has been *thoroughly* extirpated, and the canal, pulp-chamber, and crown cavity *properly* filled. I have never known a case where there was any reason to suspect pericemental inflammation to be caused by the decomposition of the contents of the dentinal tubules. The inflammation could always be more reasonably accounted for, it invariably seeming to be the result of defective manipulation or of pre-existing necrosis.''

It is not my intention, however, to discuss this problem from a clinical point of view, but rather to give the results of a few investigations of a scientific nature which I have made in reference to this question, and the conclusions which may be drawn from them.

In the first place, we must bear in mind that the only decomposition which could take place in the dentinal tubules is one which might be brought about by bacteria; in other words, putrefactive decomposition, or simply putrefaction. In the event of such a decomposition of the contents of the tubuli taking place, a great variety of substances might be produced, chiefly, however, ammonia (NH_3), sulphuretted hydrogen (SH_2), hydrogen (H), carbonic acid (CO_2), a variety of acid and alkaline substances such as formic, lactic, acetic, and butyric acids, carbonate of ammonia, propylamine, trimethylamine, etc., and finally the ptomaïnes.

It must not be supposed, however, that all these substances would be produced in any one case. How many of them might be formed would depend upon whether it were a pure or a mixed infection,—*i.e.*, whether the tubules had been invaded by one or more kinds of bacteria.

The products of decomposition arising from the action of a single kind of bacterium are, according to the few observations yet made, limited in number, stinking gases being most frequently represented, then peptone, ammonia, trimethylamine.

Nor should it be taken for granted that the quantity of gas produced in a case of putrefaction must necessarily be very great; as a rule it is insignificant when compared with the amount of gas produced by the fermentation of carbohydrates.

Bearing in mind that the putrefaction of the contents of the tubules can take place only under the action of micro-organisms, naturally the first question to be answered is, Whether and to what extent do micro-organisms from the root-canal penetrate the dentinal tubules?

At first thought the probability of an extensive invasion of the tubuli does not appear very great. The diameter of the normal tubuli, particularly in the root, is, it is true, considerably greater than that of most bacteria, so that on this score there would be nothing to prevent their entrance. It has been found, however, that the putrid dental pulp is often devoid of micro-organisms. This condition is not difficult to account for, because we know that all the nourishment contained in a pulp may soon be exhausted, and where the pulp-chamber is closed so that no fresh material is admitted from without, the micro-organisms may perish from want of nourishment, or they may be devitalized by the prolonged action of their own products. These two causes would also operate in a much higher degree in the narrow tubuli of the dentine. Add to this the fact that the access of air must be exceedingly limited, so that the aërobic bacteria could probably not live in the tubules for any length of time, and I think we would be justified, *a priori*, in regarding the tubules of sound dentine as not particularly favorable media for the cultivation of bacteria.

These are, however, only theoretical considerations ; the question as to whether an invasion of the tubules actually takes place or not can be settled by microscopical examination alone.

With this object in view I prepared sections of nineteen roots, all of which, with one exception, contained remains of putrid pulps, while four of them were abscessed.

The roots were sawed into lamellæ about one millimeter* thick and placed in a ten per cent. solution of hydrochloric or nitric acid, in which they became softened in a few hours. They were then soaked in water (repeatedly changing) to remove the acid, cut on the freezing microtome, stained by the Günther modification of the Gram method, and mounted in the usual manner in Canada balsam.

The examination of these sections revealed in many of them a condition which, while being well known to be the normal condition in the tusks of elephants, for example, has not, I believe, attracted attention in the human teeth.

In ten of the roots examined I found the canal to be completely or partially lined with a substance of a homogeneous or globular structure, containing very few or no canals but occasionally a formation resembling a bone-lacuna, and on the whole bearing much more resemblance to cement than to dentine† (Fig. 1). This layer is impermeable to micro-organisms, and acts, therefore, as a safeguard against the decomposition of the contents of the tubuli.

Open roots which serve as retaining centers for food-particles undergo the natural process of decay, by which the lumen of the canal is gradually increased. The phenomena of decay here are the same as those in decay of the dentine of the crown and neck of the tooth. A cross-section under low power is given in Fig. 2.

A microscopical examination of the sections prepared as above stated gave the following results :

No. 1. Section near open end of root showed decay and extensive infiltration of the tubules ; section near apex appeared lined with the impermeable modified dentine, except at one point, where a few cocci may be seen in eleven of the tubules.

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* One millimeter equals about $\frac{1}{26}$ inch.

† The capacity of the pulp to form other structures than dentine will be discussed in my articles on the tusks of the elephant.

No. 2. Two sections from near the middle of the root ; both show the modified dentine. In one piece four tubules are infected, in the other none.

No. 3. Sections near the open end of the root show decay ; those near the apex are lined on one side of the canal by impenetrable modified dentine without tubules ; on the other side four tubules contain a few cocci.

FIG. 1.

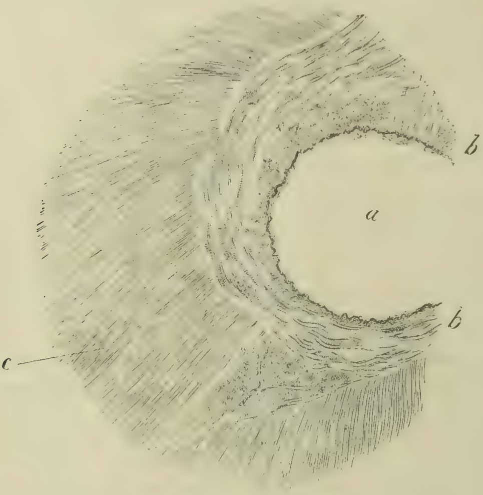


FIG. 1.—Portion of a cross-section of a root containing the remains of a putrid pulp. *a*, root-canal ; *b*, modified impenetrable dentine lining the canal ; *c*, normal dentine. No trace of infection.

No. 4. Inner layer again destitute of tubules ; no infiltration whatever. (See Fig. 1.)

No. 5. Section near open end decayed ; section near apex shows about one-fourth of the canals infected with straggling cocci to a depth of one-fourth to one-half millimeter.

No. 6. The end section is slightly decayed and correspondingly infected. The section near the apex is protected on one side by tubeless dentine ; on the other side eighteen tubules are infected by a few straggling bacilli to a depth of one-half to three-fourths millimeter (Fig. 3). A few of the tubules contain also cocci (Fig. 3, *a*, *b*), from which we must conclude either that the dentine is infected with two kinds of bacteria or with a pleomorphous bacterium.

No. 7. The root in this case contained an inflamed pulp ; no trace of tubular infection is anywhere to be discovered.

No. 8. Section from about middle of root ; twenty-six of the tubules are infected with cocci to a depth of about one-tenth millimeter. (See Fig. 4.)

FIG. 2.

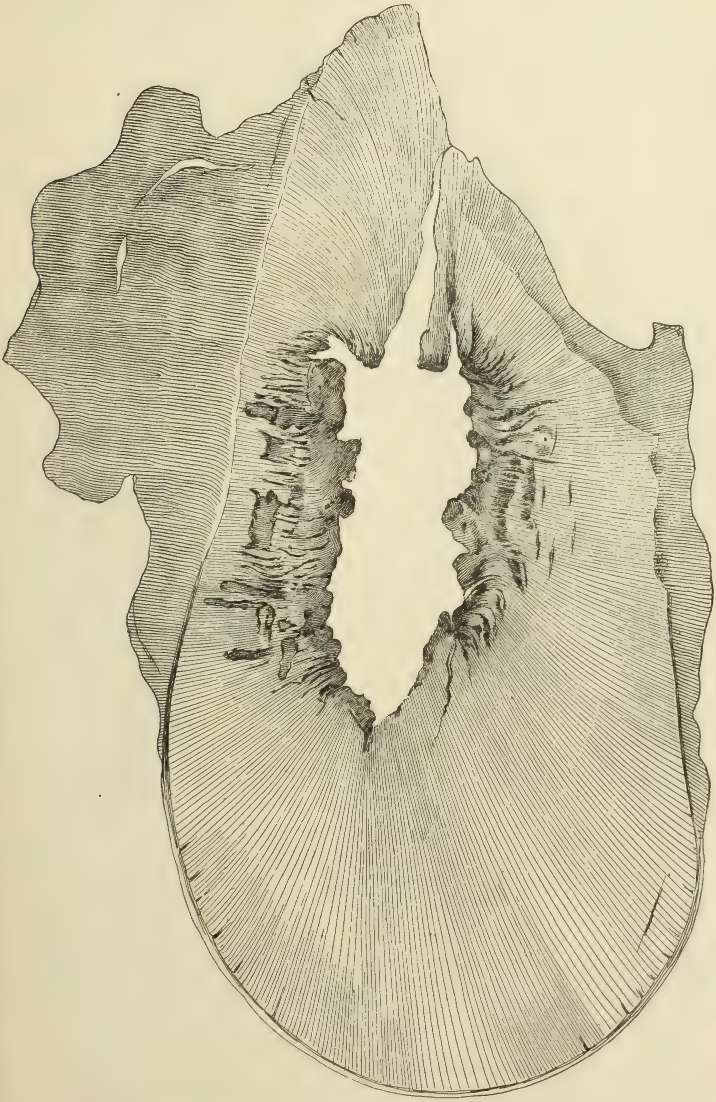


FIG. 2.—Cross-section of the posterior root of a lower molar, showing the advance of decay from the canal. 20 : 1.

No. 9. The sections show again that the canal is in part lined with modified dentine. In two or three tubules only was I able to find about a dozen bacteria. The root was abscessed.

No. 10. The canal was found filled with masses of bacteria (see Fig. 5), but no infection of the tubules worth mentioning could be detected, only a few cocci being visible in three or four tubules. The canal was again partly lined with modified dentine. Root abscessed.

No. 11. Abscessed root. Section near the pulp-chamber shows nearly all the tubules infected to the depth of one-tenth to one-fourth millimeter. Section near apex free from infection.

No. 12. Ground section from near the middle of the root; no infection of the tubules whatever.

Nos. 13 and 14. Both partially protected by modified dentine; and both free from infection.

FIG. 3.

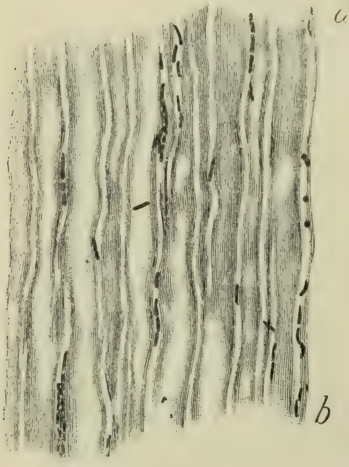


FIG. 3.—Straggling infection of the dentine of a root with bacilli, at a point ¾ mm. below the surface. 1000 : 1.

FIG. 4.

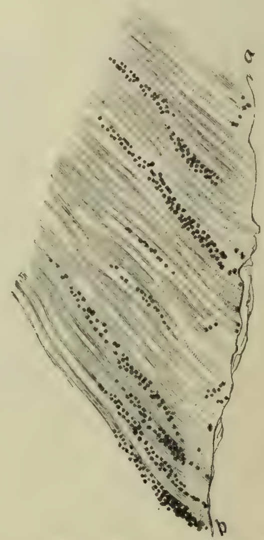


FIG. 4.—Dentine from the root of an abscessed tooth, showing the penetration of cocci to a depth of about 1-10 mm. (1-250 inch). The side *a*, *b*, bordered on the canal. 1000 : 1.

No. 15. Canal lined by a layer of modified dentine one-fourth millimeter thick. No micro-organisms visible in any of the tubules.

No. 16. Section from about the middle of a small root, showing a few of the tubules infected to a depth of one millimeter (Fig. 6).

Nos. 17–19 give results corresponding to those noted above, the bacteria having penetrated a very few of the tubules to a distance varying from one-twentieth to one-fourth millimeter.

The conclusion at which I have arrived through the examinations, if I may be allowed to draw any conclusion at all after an examination of only nineteen cases, is that we need pay no regard whatever to the contents of the tubules in the treatment of root-canals. The tubular infection is so superficial and so slight that an action upon the pericementum appears to me to be altogether out of the question. The first glance at the preparations under the microscope at once impresses one with the utter inadequacy of the infection to perform the action attributed to it. Of the cases I examined, the only one in which there could be at all a possible question of a deleterious action produced upon the pericementum by a decomposition of the contents of the tubules is that represented in Fig. 6. Let us see what are the probabilities that such an action really existed.

FIG. 5.

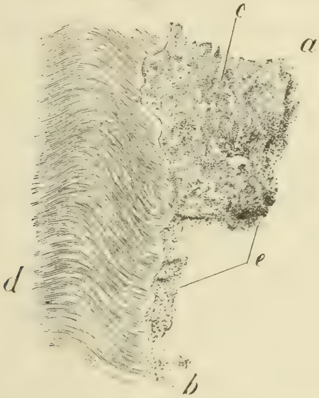


FIG. 5.—Dentine lining the canal of an abscessed root. *a*, *b*, side bordering on canal; *c*, modified dentine; *d*, normal dentine; *e*, masses of cocci. No penetration of the tubules here visible.

FIG. 6.

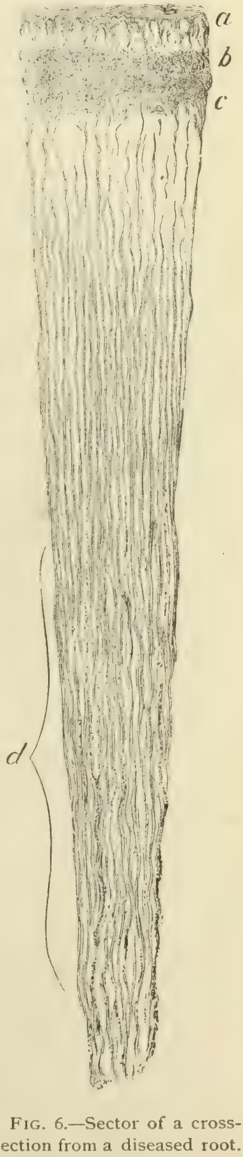


FIG. 6.—Sector of a cross-section from a diseased root. *a*, cement; *b*, stratum granulosum; *c*, very narrow and finely branched tubules; *d*, infected district. 150 : 1.

In the first place, it may be remarked that the root was not abscessed as were many of the others, which showed less infection. In the second place, we may reasonably suppose that the infection of the dentine would have been less extensive if the canal had been subjected to proper antiseptic treatment; as it is, about one-tenth of all the tubules contain bacteria more numerous toward the canal, very sparingly in the deeper parts of the dentine.

Three ways suggest themselves by which products of decomposition forming in the infected zone (*d*) may reach the pericementum:

1. The gases accumulating in the tubules might be supposed to

force the contents of the tubuli before them through the narrowing tubules, the stratum granulosum, and cement directly upon the pericementum. Personally, I place such a process entirely out of the question for the following reasons : There is no trace whatever of any change to be detected in the structure of the dentine which might indicate a development of gas in the tubules. Again, looking at Fig. 6, we find the tubules gradually narrowing and becoming finely branched as we approach the cement, and, bearing in mind that the contents of these tubules not being infected cannot have undergone any change, we will find it impossible to explain how products of decomposition from the infected district could force the contents of the tubules through the gradually narrowing canals, through the stratum granulosum, and through the cement to the pericementum.

2. Gases may break up the union between the fibrils and the walls of the tubules, and so, without dislodging the contents of the tubules, make their way gradually along the tubuli, etc., to the pericementum. Aside from the fact that the sections reveal no trace of such action, I conceive that it would require an enormous pressure to force bubbles of gas from the zone *d* to the surface of the cement.

3. The most probable and, I think, the only way in which gases might possibly be supposed to penetrate from the decomposing fibrils to the pericementum is by a process of diffusion. This, naturally, would apply only to such gases as are soluble in the fluids of the tubules. That an action of this nature does take place will be witnessed to by the fact that in drilling into a tooth containing a putrid pulp, *as we near the pulp-chamber*, the borings will sometimes be found to have an odor of putrefaction. I have not observed, however, that this odor could be detected from the more superficial layers of dentine, though Dr. Jenkins writes me that in chalky teeth he has noticed the odor soon after boring through the enamel. Now, it is quite possible that a similar action, in a diminished degree, may take place through the solution and subsequent diffusion of gases generated in the tubules themselves, though such an action would always remain insignificant when compared with the absorption of gases from the pulp itself; and the possibility that the whole substance of the root may in this way become permeated with the products of decomposition, and to such an extent that they should have an irritating action upon the pericementum, is very slight indeed.

In conformity with the observations which I have made in practice and with the results of my theoretical and experimental examination of this subject, I am in the habit of utterly disregarding the contents of the tubuli. If I am able to thoroughly extirpate the pulp and antiseptically cleanse the canal, I have nothing to fear or to anticipate through decomposition of the contents of the tubuli.

To those who may be of a contrary opinion I would suggest that the only way for them to fill canals is to close the foramen with cement, gutta-percha, or some similar material, and then fill the canal with a substance such as pulverized charcoal, which will absorb the gases which they believe to be formed in the tubuli.

THE JAWS AND TEETH OF A PARTY OF CAVE- AND CLIFF-DWELLERS.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

THE cave- and cliff-dwellers having interested me for a number of years because they are supposed to be the remnant of an ancient race, I visited them while they were in Chicago. Three of the eleven persons in the company are cliff-dwellers, the rest half-breeds. The habits of the former may safely be assumed to have been the same for centuries. Civilization has not affected their jaws and teeth, and for this reason they are a study to the etiologist.

I found them in a bare room of a dilapidated building, huddled around an old rusty stove, and peacefully smoking cigarettes. All excepting one squatted on the floor, as is their custom. In one corner a few rags were seen on the floor serving as a bed, in the other was a dirty mattress. Their provisions, wrapped in brown paper, were thrown along the wall, on which a solitary bow and arrow were hung.

From a letter published in the newspapers and the lectures of Lieutenant Schwatka, I learned the history of these people, and the gentleman who has them in charge gave me such other points as I desired to know.

The Yarahumari tribe of Indians occupy a territory in the south-western part of the State of Chihuahua, in the republic of Mexico. This territory is an irregular oval in its boundaries,—the long axis being about one hundred and fifty miles, the short diameter about fifty miles. There are about four or five thousand Yarahumaris in this district, of whom a large number live on the plains, and show, in their manner of living and habits, the evidences of contact with civilization. The remainder live in curious cave- or cliff-dwellings among the precipitous mountains which cover their territory. Lieutenant Schwatka brought eleven of them North, of which eight are semi-civilized and three are veritable cliff-dwellers. These three are the most interesting members of the party. They comprise a man, his wife, and child. They came from a cliff-dwelling about twenty-five miles from Yoquiro, a little village sixty miles southwest of Batopilas. The men of the party are medium-sized, of slender build. In color they are a rich brown. They have round but well-shaped heads, with long, bushy, straight, coarse black hair, curving at the ends, somewhat prominent cheek-bones, broad faces. They have large but well-shaped mouths ; their eyes are large, brilliant, with gentle, pleasing expression. Their bodies are well formed and graceful. They are inured to hardships, and are able to stand extremes of temperature with little inconvenience, notwithstanding their scanty clothing.

The bow, the only weapon of the cave- and cliff-dwellers, is about four feet long, of "moro" wood, with a twisted deer-hide string. The arrows, about two and a half feet long, are of light cane, the tip being round or triangular, of an excessively hard, fine-grained wood, called uiloche. These tips are about eight inches long. They are very expert with this weapon, and kill deer, wild turkey, and great hawk, whose feathers are used to feather their arrows. Their dwellings are of two kinds,—cave- and cliff-dwellings,—the distinction being that of location. All live in caves, but some choose caves opening upon the level, while the cliff-dwellers select caves high up the precipitous cliffs of the great cañons. These caves are usually single, large apartments with semi-circular mouths. These the cliff-dweller walls up with rude masonry nearly to the top, leaving a space for ventilation and the escape of smoke. An opening for a door is also left. Rarely they erect rude stone buildings inside of the cave-mouth. These caves are reached by long-notched pine trunks, like the rude ladders used in mines. The furniture is simple : a goat or deer skin or the bare ground for a bed, a few baked pottery dishes made by the women, a fire of pine knots ; that is all. A single family lives in each cave, but several generations of one family usually live together in the single apartment. They are monogamous, and seem to be chaste. They have a rude government of their own not well understood. They punish crimes committed by and among themselves, the Mexican government interfering only when one of the parties involved is a Mexican citizen. They are a quiet, peaceful, simple race, very shy and wild, fleeing away at the approach of a stranger. They live by cultivating corn and by the chase. Corn is their staple food, and is used in many ways. Occasionally they make tortillas, but the usual form of using corn is in "pinole" or "atole." "Pinole" is dry corn ground to a very fine meal. This is taken either by throwing dry dust into the mouth and washing it down with water, or by mixing it with water and drinking it. This latter is the more usual method. "Atole" is the soft corn crushed in water. Venison is broiled on the coals or baked in hot ashes. There are plenty of bear in the mountains, but these they never attack, whether from fear or religious superstition is not known. From corn they manufacture a sort of beer, by dampening the corn until it sprouts, then slightly parching it, then making a mash with water. When the right stage of fermentation is reached it is drunk, as they have no means of arresting the fermentation. To get the intoxicating effect, they fast two or three days, then drink it in large quantities. They obtain small fish by damming up mountain streams and poisoning the waters with a plant which poisons the fish while not harming them for food.

They have no knowledge of traps or nets, depending for their success in hunting on their fleetness of foot and expertness in the use of the bow and arrow. Their run is swift and graceful, continuing for six or seven hours. Then they sit down and rest and drink pinole and water, and start again. There are astonishing accounts of their speed and endurance. Lieutenant Schwatka says that they ran seventy miles along with the stage and that he changed mules five times, and yet they beat the stage by an hour and a half.

They have a bright and happy disposition, are honest and temperate, not given to quarreling. It is said their language is poor, containing only two or three hundred words. No trace of legendary history has as yet been found among them, nor do they seem to have any old songs, though they are heard chanting a low monotonous song.

I made an examination of all the Indians belonging to the company. I found all of their jaws wider and deeper than the average jaw of Americans ; the upper alveolar process unusually well developed. Depth of posterior columns and breadth of anterior columns are characteristic features. The teeth are deeply set, with broad, square crowns. The grinding-surface of the molars and occasionally the bicuspids showed constant use in mastication, even among the boys. The oldest member was forty. The third molars are all well developed and in a vertical position, except in one case where one was missing, and there was abundant space back of the teeth. Their superior incisors do not overlap the inferior incisors, and the cusps of all the teeth are nearly on a line, showing the results of much grinding. The cusps of the molars were less developed or more ground down than ours. Their vaults are low, the rugæ almost absent ; their tongues are small, and have the power of being carried far back into the fauces, pointing to great motility and constant motion in shifting the food from one side to the other in the back part of the mouth. It is known that the mound-builders and other early tribes of Indians in America, who lived on shells, infusoria, and corn, possessed similar jaws and teeth, which leads to the supposition that these people are descendants of an early race.

In examining the charts of the different members of the band it will be observed that tartar and caries abound, that pyorrhea is met with frequently. The absence of all care and cleanliness explains these conditions. Even slight irregularities are met with ; these, however, are not the result of small jaws, but of local causes.

The names of the Indians examined could not be obtained, and their ages only approximately. The accompanying cuts show the maxillæ of the cliff-dwellers that belong to the poorest and most ancient race. The cavities of the crowns are all of the fissure variety ; those upon the buccal surfaces start from the buccal pit. In but few cases were there approximal cavities, indicating that the decay is more the result of improper enamel formation than of fermentation.

No. 1. Interpreter and Leader.

Height, 5 feet 6 inches.
Occipito-frontal circumference, 22½ inches.
Width of alveolar arch at first molar, 2½ inches.
Arch prominent, well developed, deep.
Caries :
  Upper right side, lateral ; molars 2d and 3d, crowns.
    " left side, lateral ; cuspid ; molar 2d, crown.
  Lower right side, molars, crowns, 1st, 2d, 3d, buccal 1st, 2d, 3d.
    " left side, molars, crowns, 1st, 2d, 3d, buccal 1st, 2d, 3d.
Irregularities : Space between centrals ; centrals turn in.

No. 2. Wife of Interpreter.

Height, 4 feet 10½ inches.
Occipito-frontal circumference, 21½ inches.
Width of alveolar arch at first molar, 2½ inches.
Arch well developed, deep.
Caries :
  Upper right side, molars, crowns, 1st, 2d, 3d.
    " left side, molars, crowns, 1st, 2d.
  Lower right side, molars, crowns, 1st, 3d, buccal 2d.
    " left side, molar, crown, 1st, buccal 2d.
Irregularities : Centrals curved and turned inward toward the mesial line ; jaws normal.

No. 3. Pure-bred Cave-Dweller. Man Forty Years Old.

Height, 5 feet 4 inches.
Occipito-frontal circumference, 23½ inches.
Arch, width at first molar, 2½ inches.
Caries :
  Upper jaw, right side, bicuspid ; molar 3d, crowns.
    " " left side, left lateral, mesial surface ; bicuspid 2d ; molars 1st, 2d, 3d, crowns.
  Lower jaw, right side, molar 2d, buccal.
    " " left side, bicuspid 2d ; molar 3d, crowns.
Irregularities : Lower arch saddle-shaped.
Pyorrhea and tartar.

No. 4. Cave-Dweller. Man.

Height, 5 feet 5 inches.
Occipito-frontal circumference, 23 inches.
Width of arch at first molar, 2½ inches.

Caries :
Upper jaw, left side, molar 2d, crown.
Lower jaw, right side, molars 1st, 2d, crowns.
“ “ left side, molars 1st, 2d, crowns.

Pyorrhea.

No irregularities ; jaws large and normal.

No. 5. Cave-Dweller (Wife) Eighteen Years Old.

Height, 5 feet 1 inch.

Occipito-frontal circumference, 22 inches.

Width of arch at first molar, $2\frac{5}{16}$ inches.

Caries :
Upper jaw, molar 2d, crown.
Lower jaw, right side, 2d molar, crown and buccal.
“ “ left side, 2d and 3d molars, crown and buccal.

Protruding alveolar process above.

Arches large and normal.

No irregularities.

No. 6. Cave-Dweller. Man.

Height, 5 feet 4½ inches.

Occipito-frontal circumference, 22 inches.

Arch, width at first molar, $2\frac{9}{16}$ inches.

Upper jaw, right side, molars 1st, 2d, 3d, crowns.
“ “ left side, four labial surfaces of upper incisors ; molars 1st, 2d, 3d, crowns.
Lower jaw, right side, molars 1st, 2d, and 3d, crowns ; molar 1st, approximal ; bicuspid 2d, approximal ; 1st molar abscessed, crown gone.
Lower jaw, left side, molars 1st, 2d, and 3d, 1st abscessed, crown gone.

Irregularities : 1st right bicuspid twisted.

Tartar on upper teeth ; pyorrhea.

No. 7. Boy Twelve Years of Age.

Occipito-frontal circumference, 18 inches.

Width of arch at first molar, 2½ inches.

Caries :
Upper jaw, left side, bicuspid 1st ; molars 1st and 2d, crowns.
Lower jaw, right side, molars 1st and 2d, crowns.
“ “ left side, molars 1st and 2d, crowns ; molars 1st and 2d, buccal.

Arches well developed.

Irregularities : Centrals turned in.

No. 8. Cave-Dweller (Boy) Fourteen Years of Age.

Height, 5 feet.

Occipito-frontal circumference, 22 inches.

Arch, width at first molar, $2\frac{5}{16}$ inches.

Caries :
Upper jaw, right side, bicuspid 1st ; molars 1st and 2d, crowns.
“ “ left side, bicuspid 1st ; molars 2d and 3d, crowns.
Lower jaw, right side, molars 1st, 2d, and 3d, crowns, buccal 1st, 2d.
“ “ left side, molars 1st, 2d, and 3d, crowns.

Slight pyorrhea.

Arch normal.

No. 9. Cliff-Dweller (Man) Twenty Years Old. (Figs. 1, 2, 3.)

Height, 5 feet 9 inches.
Occipito-frontal circumference, 24 inches.
Width of arch at first molar, $2\frac{7}{16}$ inches.
Caries:
  Upper jaw, right side, central; molar 2d, crown.
    " " left side, central; molar 2d, crown.
  Lower jaw, right side, central; molar 2d, crown.
    " " left side, central; molar 2d, crown.
Pyorrhea, tartar.
Jaws regular.

No. 10. Wife of the Above. (Figs. 4, 5, 6.)

Height, 5 feet 1 inch.
Occipito-frontal circumference, 22 inches.
Width of arch at first molar, 2⅜ inches.
Caries:
  Upper jaw, right side, central; molars 1st, 2d, and 3d, crowns.
    " " left side, central; molars 1st, 2d, and 3d, crowns.
  Lower jaw, right side, molars 1st, 2d, and 3d, crowns; buccal 1st, 2d.
    " " left side, molars 1st, 2d, and 3d, crowns; bicuspid 2d.
Arches well developed.
Irregularities: First bicuspid outside of the arch and on line with the cuspid; mesial surfaces of centrals turned inward.
Pyorrhea, tartar.

No. 11. Baby of the Above, One Year Old.

Alveolar process large.
  Upper jaw, centrals, laterals, and first molars through.
  Lower jaw, same.

When the jaws of these Indians are compared with those of the average American, it will be seen that they are considerably larger and deeper, that the anterior columns have a greater diameter. From the description of their habits, it is evident that their mode of life is on the whole healthful. Plenty of muscular exercise, plenty of rest, quiet, cheerful dispositions, and a life not governed by conventionalities but in which natural impulses are allowed to sway conduct, are conducive to sound bodies. These large, well-developed jaws may be partly due to race peculiarity; but there is no doubt, when we compare with these the unnatural position of the third molar in the jaws of many persons of the present generation, and notice the frequency of contracted arches, that the jaws are growing smaller, and that the prevalence of nervous strain brings about these conditions.

The illustrations are taken from the casts of the mouths of the cliff-dweller and his wife, and represent the average contour and size of the jaws of all examined. Figs. 1, 2, 3 show the denture of the man; Figs. 4, 5, 6 exhibit that of his wife:

FIG. 1.

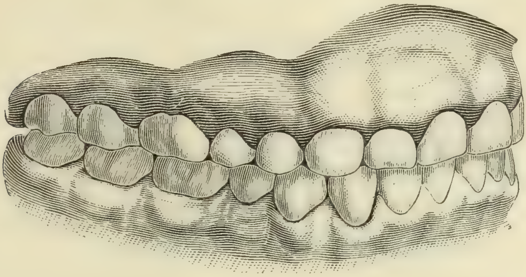


FIG. 2.

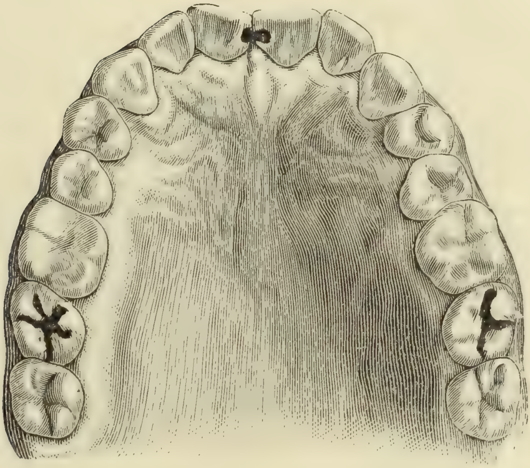


FIG. 3.

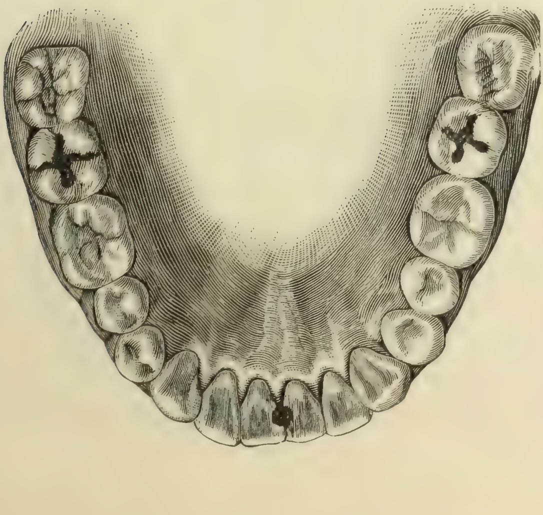


FIG. 4.

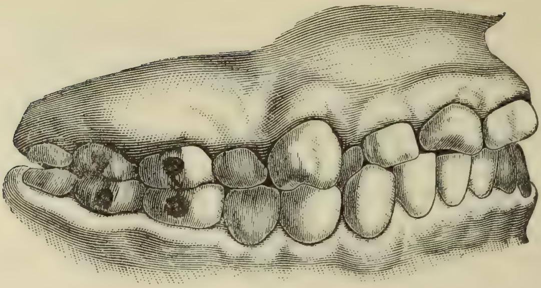


FIG. 5.

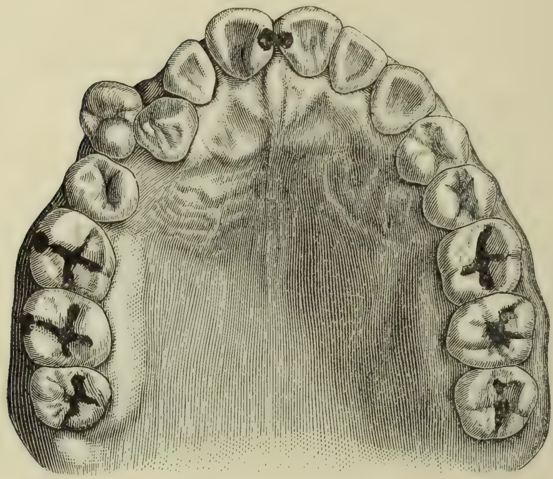
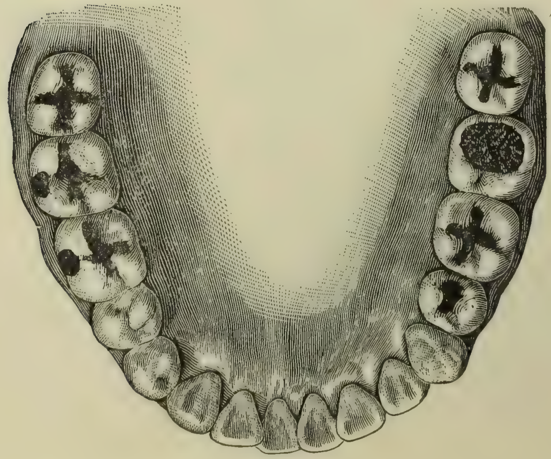


FIG. 6.



FEATHERED POSTS FOR TOOTH-CROWNS.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

SERIOUS difficulties are encountered at various points in the process of setting an artificial tooth-crown on a natural tooth-root. By no means the least of these embarrassments is the obtaining of a close fit of a post in a root, so that the post cannot be turned in its socket by a rotating strain on the crown. Square, oval, triangular, and parallelogrammatic posts have been employed with that object in view, and because of the great difficulty of forming in the root suitable sockets for those angular and straight-sided posts, it has been the practice to provide tubes corresponding in cross-section to the posts, and by first setting the tubes in the roots, to insure the fitting of such posts in those sockets. The provision of tubes, the fitting of them, and the fastening of them in the roots has, however, been the occasion of much delay, expense, trouble, weakening of the teeth by reason of the necessarily large bore required for the tube, and of various other incidental perplexities that, taken together, have hindered frequent resort to that method.

The requirements of some forms of modern crown-work have led to the frequent adoption of a square post set in a round hole with cement or amalgam, which is relied upon to prevent the rotation of the crown in use.

It has been the good fortune of the writer to devise means under which those difficulties and defects disappear, and very simple satisfactory results are made certain by the use of common materials and instruments. The procedure is as follows:

Cut and polish the end and edges of the root exactly and thoroughly. Select a piece of straight round wire of suitable size, say No. 17, and preferably of iridio-platinum. With a drill (preferably a twist) that has been tested in a piece of bone and found to make a hole that the wire will exactly fit, drill the tooth-root to the proper gauged depth (Fig. 1). Then, with a fissure-bur, No. 55½ or 66½, carefully cut a longitudinal groove in the side of the root-bore equal to about the length and thickness of the cutting-part of the fissure-bur. Fig. 2 is a section and an end-view of the root so prepared. Take a short piece of small platinum wire, say No. 22, fix it on the post with binding-wire as in Fig. 3, flatten a common pin as thin as a hammer will make it, dip but the point of the pin in thin borax paste, and touch only the contact line of the two wires with the borax. Put the least bit of gold plate, or pure gold, or fine gold solder on the outer end of the post, hold in the flame of a Bunsen burner, and neatly unite the two wires without running any solder over their sides. This feathered post should be found to fit closely the grooved socket, as in Fig. 4;

resist every effort to rotate it, and yet permit withdrawal by a direct pull. A thin platinum plate may be then fitted on the root end, a plate tooth backed, adjusted, and hard-waxed on the plate and to the feather-wire, the end of which should be left free as in Fig. 5, so that it may be grasped by pliers to withdraw the crown and the plate without disturbance, for investment and soldering in the usual way. Fig. 6 shows the completed crown, after mounting with sandarac varnish, hot resin, copal varnish, or very thin cement. In favorable cases, under skilled hands, using exact instruments, the feathered post-crown will fit nearly moisture-tight, and the varnish will make it quite so.

FIG. 1.

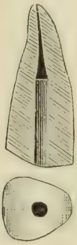


FIG. 2.

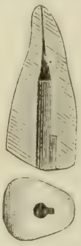


FIG. 3.

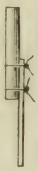


FIG. 4.

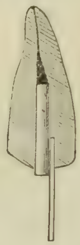


FIG. 5.

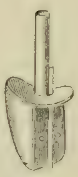
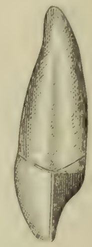


FIG. 6.



It is entirely practicable to fit the plain wire post to the simple round socket, to fit the root-plate, to back and adjust the crown, and to remove and solder all together as usual; then reinvest the crown in plaster and marble-dust, leaving the post exposed. To this solder the feather of small wire, locating it so that its seat will be in the thickest part of the root. Then put it on the root, mark with a pencil the place of the feather, and with the fissure-bur cut the groove for the feather, which may be filed slightly to give it a wedge shape, and by frequent trials with careful corresponding cuttings of the groove with the bur be made at least to go to its seat so tightly as to be secure against dislodgment in use.

FIG. 7.

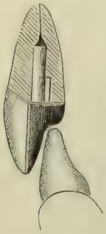


FIG. 8.

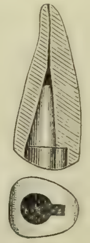


FIG. 9.

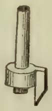
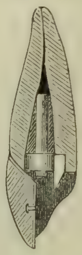


FIG. 10.



It will be noticed that the post is materially strengthened by the feather, which reinforces the post in the line of resistance to outward thrust during the acts of incising or grinding with the crown.

Special cases, where the root is small and short, as in Fig. 7, and the crown subjected to hard usage by the deep under-bite of the opposite tooth, will be well met by the feathered post, which affords the maximum strength of crown attachments with the least possible removal of root-substance.

Whenever the root end is somewhat decayed, the feather seat may be cut at the soundest part. In greatly wasted cases the root may be collared, filled, and the filling drilled and prepared as first described.

FIG. 11.

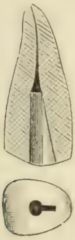


FIG. 12.

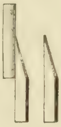


FIG. 13.

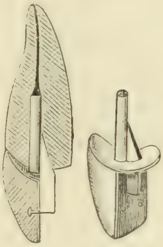
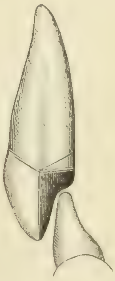


FIG. 14.



If the canal is unusually large, as in Fig. 8, a narrow strip of plate may be bent around the post and pinched close upon it. A suitable clamp will hold the plate ends together while they and the plate are being soldered on the post. The piece is then filled to the shape shown in Fig. 9. Before drilling the root, it is well to drill a trial-piece of bone, and with a large round bur, followed by an inverted cone bur, form the enlargement of the socket, and with a fissure-bur cut the groove for the feather. Of course, the better way is to make a countersink-drill that will at once and truly cut both the socket and its enlargement at the same time. Fig. 10 shows in section the finished crown.

FIG. 15.

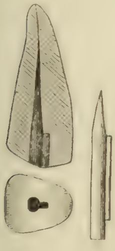


FIG. 16.

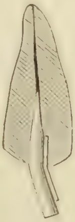


FIG. 17.

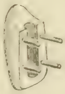


FIG. 18.

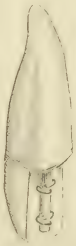


FIG. 19.

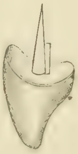
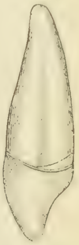


FIG. 20.



In some instances a wedge-shaped seat may be burred and cut square by a file, as in Fig. 11. The feather is then to be made of a piece of plate and soldered to the wire (Fig. 12), the operation preparatory to removal for investment being shown by Fig. 13. The completed and mounted crown is illustrated in Fig. 14.

It may sometimes occur that a tapering post is desirable. Such a one is shown straight in Fig. 15, and bent inwardly, as in Fig. 16, to suit some requirements of adjustment. The How four-pin crown, Fig. 17, may be readily adjusted on the feathered post by bending the long pins around it, as in Fig. 18, and be then removed, invested, contoured with porcelain body and enamel, and baked in the Parker-Stoddard furnace with the excellent result shown in Fig. 19, the mounted crown resembling that seen in Fig. 20.

It would be easy to multiply modifications and applications of the feathered post device, which has its familiar counterparts in many mechanical structures, but is novel in its adaptation to dentistry. Like all such simple things, it occasions surprise that it should not have been previously suggested, and its crowning advantage is that the ordinary dentist, by means and materials within common reach, may employ the feathered post as a readily recognized improvement on the well-known methods of mounting tooth-crowns.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

(Concluded from page 300.)

THIRD SESSION—*Wednesday evening, January 15* (Continued).

DR. WALKER, chairman of the Executive Committee, announced that owing to severe illness, Drs. Darby and Kirk were not able to be present to read their joint paper, "The Manual-Training Idea as a Factor in Dental Education."

On motion of Dr. Walker, a telegram was sent to Drs. Darby and Kirk, expressing the sympathy of the society in their illness and the hope of their speedy recovery.

Dr. George S. Allan read a paper entitled "Theory and Practice in the Treatment of Proximate Surfaces."*

Dr. Allan, after reading his paper, explained a number of magic-lantern pictures illustrating his subject.

Discussion.

The President. Gentlemen, Dr. Harlan is not feeling very well physically, but mentally he is at his best, and will now claim your indulgence to make a few remarks.

Dr. A. W. Harlan. Mr. President, members of the First District Dental Society of the State of New York, and visitors : I was not aware until a short time ago that I would be called upon to open the discussion on this subject. There seems to be something in this connection that is totally out of place. I am a professor of materia medica and therapeutics in a dental college, and I am asked, on a few moments' notice, to open the discussion on the subject of theory and practice in the treatment of approximal surfaces.

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* See DENTAL COSMOS for April, page 255.

I have listened to the essayist with as much intentness as I could direct at this subject. I have looked at the beautiful drawings or sections that have been projected on the screen, and have been much entertained. The essayist starts out with the question whether it is best to contour a tooth or make a flat filling. The exposition of the sections on the canvas has been to show the inherent weakness of the enamel; and the author of the paper has not differentiated between the cases that require filling when the tooth is pulpless, or when it still has within it a living pulp. Now I ask you observant dentists, members of the First District Dental Society of the State of New York, resident in the city of New York, the metropolis of the United States, if in your observation you have not seen that the majority of teeth that require fillings that may approximate a contour—the return of the tooth to its natural shape—are not those in which the pulp has already died, or where you meditate its death before the tooth shall be filled? If we look at a tooth or a dental arcade in its normal state, what do we find? That the teeth are flat-sided, and that they are separated by a gap through which you could drive a coach and four? Or that they are closely approximated so that their sides touch more or less, according to the shape and conformation of the individual teeth? I ask which condition you observe. I know that as dental anatomists you will answer that the teeth approximate each other, therefore have a point of contact, and that if they maintain their integrity the person having such a set of teeth, such a dental arcade, is one that is free from care, because in the mastication of his food he does not suffer any of the inconveniences or distress that is occasioned by the impaction of food between his teeth in consequence of their separation. Now, I do not profess to be an ideal operative dentist. I do not profess to be one that makes contour his god. I do not profess to be even one who can make the most perfectly solid gold plug in a tooth, whether it be pulpless or living; but I have eyes and I see. I have been engaged in the practice of dentistry for more than twenty years, and I have seen a large number of teeth during that time. I have seen indifferent operations, I have seen operations that were below the order of respectability; I have seen operations both of contour and attempted contour and flat surfaces; and if you were to ask me now, had I a tooth to be filled, how would I like to have the operation done, I should say by all means, if you are capable of performing that operation, and if it is to be done with gold, restore it to its original outline. It may be that there are gentlemen present so unfamiliar with the qualities of gold, and so unfamiliar with the anatomy of a tooth, that they do not know how to construct a filling on mechanical principles; but that argues nothing against the ideal operation. The trouble is, gentlemen, that the dental profession, not excepting members of the First District Dental Society of the State of New York, are unfamiliar with the groundwork of mechanics; they do not understand dental technique, they are unfamiliar by practice and experiment with the shapes of the teeth; and it is in consequence of this unfamiliarity, it is in consequence of the misunderstanding of correct mechanical principles, that the miserable apologies for contour work are spread throughout this broad land. The duties of the day press too hardly upon those who would attempt to approach the practice of the ideal dentist. They say they have not time. The essayist says himself that the question of expense comes in here. I would like to ask the gentleman if the artist who has an ideal and seeks to portray it in marble or delineate it on canvas asks himself, Will my patron be able to afford to purchase my creation? No; he would destroy every artistic sense that inspired him to create, should he ask that question for a moment. The essayist has spent an hour and three-quarters in presenting this subject to you; I have but a few minutes. Unknown to most of you, I come from that section of the country that has been denominated the Windy West; and I want to say to you that we have in that city correct ideas about the practice of dentistry. If they have not been taught so by the text-books, teachers, or the dental journals, those ideas are inborn. We are professional men by instinct; we can see the difference between right and wrong; we recognize the ideal as contrasted with the purely mechanical; and I say to you that even though two-thirds of you or three-fourths of you are committed to the theory that a flat surface is the one that should be left on an incisor or bicuspid or a molar tooth, you are not only wrong in theory but you are wrong in practice. You cannot abuse nature and substitute something inferior for God's handiwork.

The President. We will now listen to Dr. Peirce, of Philadelphia, after which this meeting will adjourn until to-morrow afternoon at half-past three, when the discussion of this subject will be continued.

Dr. C. N. Peirce. Mr. President and Gentlemen: The hour is late, so I shall not detain you with any extended remarks upon the exhaustive paper to which we have just listened; not that the essay so well presented and so beautifully illustrated is not amply entitled to commendation and criticism, but you are all weary with the day's work and I cannot be guilty of adding to your fatigue.

It was a pleasure to follow the essayist and subsequently to note how aptly the illustrations confirmed the text. The lesson so conspicuously taught in it all is that our numerous patients vary not only in their constitutions or systemic and temperamental conditions, but also, and to a like extent, in their powers of endurance and recuperative ability. One who has studied the teeth in their relation to temperaments has certainly not failed to find these organs varying in strength or capacity and recuperative power, but little less than the more vascular tissues. With this fact so patent, is it possible for the skillful or educated dentist to work upon all his patrons alike to an ideal standard in either the density or the contouring of his fillings? Thousands of teeth can be and are saved for years by a wise recognition not only of their structural capacity but also of the power of endurance of the patient. Again, it must be recognized that teeth vary not only in individuals but in the same individual at different ages. In the immature or young, teeth are protected with plastic and face fillings, and while these are oftentimes inserted under the most unfavorable conditions, they for a period serve well the purpose. Subsequently, when maturity is reached, gold may replace the previous filling with advantage, while had it been first employed failure would certainly have been the result. Advancing years or old age again mark a change in tooth-structure. When waste exceeds supply, there is evidence of a loss of the continuity which had previously existed between the organic and inorganic elements ; the latter are more readily disintegrated, and, as evidence of this, teeth which with the aid of a good solid filling have through mature and middle life long withstood the influence of their environment, in old age rapidly disintegrate until only an unsightly stump is left to mark the spot they once adorned. In many operations which are daily performed upon the teeth it is of the greatest importance that the enfeebled condition of the structures be recognized, as well as the intimate relation the tooth holds to the most vascular of structures. The force which is essential to the consolidation of a gold filling may greatly tax the one, while the diminished strength of the walls of the cavity may be entirely overcome by the force in mastication necessarily exerted upon the projecting shoulder of a contour filling. Admitting the many little annoyances necessarily accompanying what are termed face fillings, yet the extended length of time of the usefulness of the organ is surely a compensation for this discomfort. In following the paper as it was deliberately read by the author, one hears no discouraging word for contour fillings where the indications are all favorable for support and protection, but only a caution in favor of a wise discrimination, so that hours of exhausting toil on the part of the operator and a severe nervous strain on the part of the patient shall not prove fruitless and result in a total wreck and complete sacrifice of the whole organ.

Just one illustration, and I shall not detain you longer. A lady called upon me with her mouth exquisitely adorned with what might be termed jewelry-work,—bicuspids contoured to perfection, not only upon frail structures, but with vascular attachments far from normal. Though the bicuspids were largely the faulty members, yet the function of all the teeth was largely abridged by the abnormal condition of these, and not until the fractured remains were protected by face fillings with plastic foundations was a degree of comfort attained. The moral of it all is simply that a wise judgment based upon a fruitful experience is the indication of an educated dentist.

FOURTH SESSION—*Thursday afternoon, January 16.*

The president, Dr. A. L. Northrop, in the chair.

The President. We will continue the discussion of Dr. Allan's paper of last evening by calling upon Dr. Atkinson, of New York.

Dr. W. H. Atkinson. Mr. President and brethren: I have talked so much upon the preparation of cavities, the materials and the mode of inserting them in decayed teeth, that it seems like repeating the A, B, C's or spelling the simplest words and phrases. Dr. Allan thought he had found fault with contour fillings and had shown their deficiency. He did what every man does who bites off more than he can chew. He makes a bad portrayal of what he has seen, and names them first-class operations. It is either deficiency in the preparation of the cavity or mode of inserting the filling, or success every time. I know Dr. Allan well, and have watched him long and with much interest, and I was sorry to see him consume so much time, thinking that he had gone over ground that would be beneficial to anybody. I would be sorry to have the boys take his presentation of the subject as a lead. Men who are able to discriminate, and who know as much as he does, or, perhaps, transcend him, may not be injured by it. That nature's laws and the fulfillment of them demand the restoration of the contour of a decayed tooth is so apparent that it seems to go without saying. In clinics and meetings, when I first came here, my mode of expression in that regard was to restore a tooth as far as possible to the same size and proportions that it had originally of tooth-substance, by filling with gold.

Dr. Allan redeemed himself at the close of his paper when he said that gold was the best filling-material if it were not for its thermal conductivity. In order to avoid that difficulty to some extent, fill the cavity, or the body of it, with some non-conducting material,—oxyphosphate or anything that approaches nearly the conductivity of the tooth-substance itself,—then put a shell of gold over it, and you have a complete filling that does not have a conductivity sufficient to bring about the injurious results delineated in the paper,—dead pulps.

I know Dr. Allan to be a beautiful manipulator, honest to the tips of his finger-ends, but failure comes because we are imperfect in some of the steps that I have mentioned.

Dr. H. J. McKellops. Friends and brethren of the dental profession : If there is anything that I love to do, it is to stuff a tooth ; and if there is any material that I love to manipulate, it is gold. I listened to my distinguished friend's paper with a great deal of interest ; but I certainly must differ from him a little bit. He may be at some watering-place in the summer and see a great many people. So do I. I travel this broad country all over ; wherever there is a dental society, I am there, be it in California, or Texas, or New York, and I see some work as beautiful as ever came from the hands of man. I have sat with poor Varney in his little room hour after hour ; I have been to Dr. Atkinson's place, where he took me by the hand and showed me the manner in which he manipulates ; I have stood by Marshall Webb day after day, and for three hours after I saw that man give a clinic at Niagara Falls we were speaking about contour work and its difficulties and advantages.

There are cases where it is impossible for a man to get along well without contouring, and there are cases where he should not use it. It is not supposable that a man is going to contour everything. If there is no tooth approximating the one he is operating on, where is the necessity of putting in a contour filling?

One gentleman stated, among his objections, that the suffering caused by the operation was too much for the patient. I pretend to be master of the situation when I am operating, and to have a gentleness of touch and kindness of heart that enable me to handle the teeth even of a child without torturing it and making it afraid to sit in my chair. There is a great deal in the manner in which we handle patients, especially children. Oftentimes a man will come in with his child and say, "I want that child's tooth taken out ; I have sat up all night with it ; I cannot stand it." I ask him, "Who does this child belong to?" "That is my child." "How came it in this condition? Have you paid any attention to the little one's teeth?" Says he, "I see it all : it is my fault ; I will have them all down here to-morrow."

With kindness and gentleness a skillful operator can do the necessary work in these cases, even to contouring fillings between two small bicuspids. He adjusts the rubber-dam and spreads the teeth apart with the separator, by which they are held like the rock of Gibraltar, and he can then manipulate with the greatest ease and comfort to the patient, although he uses the electric mallet striking two or three thousand blows a minute. The gold must be of proper quality and size, and the instruments the best that can be made. With such materials and such instruments, and surroundings in keeping, first-class work can be done.

There are certain times and certain cases when you cannot do without contouring,—approximal cavities of incisors, bicuspids, and molars ; you can bring those teeth into contact, and thereby prevent the food from crowding down between them and save the patient a great deal of discomfort. It is easily and beautifully done, if you have the skill and the requisite delicacy of hand and touch, and the proper instruments to do it with.

Dr. L. D. Shepard. Mr. President and Gentlemen : I will take but a few moments of your time. One thought that is suggested by the paper, as the basis of our judgment in regard to contour fillings, is that in a comparison of the past and the present we find there was an old dispensation and there is a new dispensation. The old dispensation was represented by Drs. Harwood, Tucker, and others, of Boston, and represented by other men here and in Philadelphia, whose names I will not call because I am not so positive in regard to their position in what I speak of,—men who have had a motive always prominent in their professional life, one question which, in the diagnosis of cases, stood foremost of all other questions, and that was, what method of treatment should best conserve their own reputation. This is a serious charge to make, if you take it unkindly ; but from those men I have heard the expression that it was their duty as leaders to take care of their reputation for the benefit of the profession and of their patients and the public ; and their reputation demanded that they should not attempt to save teeth in cases the result of which was in doubt. I have heard one of these gentlemen say that dead men tell no tales ; consequently, if a tooth was in such a condition that it was doubtful whether filling would save it, they would extract it at once and put it out of the way. Now, we might criticise this idea unkindly, but I do not think it would be just to do so. I mention it as a fact, that the most prominent men of thirty years ago did not put gold fillings into frail teeth. The new dispensation came. What was that? The dentist's reputation was nothing. One idea animated him : that was the good of the patient ; the question that presented itself was not whether he was sure the operation would be successful and the teeth saved, but whether the patient, under all the aspects of uncertainty, was willing to take the trouble and bear the possible failure and pay for the experiment in making the attempt to save it. The result of this new dispensation upon most of the younger men, and many of the older men who are living under it, is that, since cohesive gold, the mallet, the rubber-dam, and other modern conveniences have come into use, teeth have been filled with gold and the attempt made to save them which under the old dispensation would have been consigned to the forceps. This is a very important idea to have before us in our comparison of the results of contour filling, or modern operations, with the results attained by those older men whom we revere as men of skill who introduced gold fillings with such solidity in the olden time. I will not enlarge upon this. My experience in the examination of graduates of colleges, particularly of young men, has shown me many things ; and I have almost never met a modern young man who prepared a cavity as it was prepared by such men as Harwood and Tucker ; and the fillings made by those older men—and I have seen thousands of them—stood from twenty to forty years. But, gentlemen, they were put into strong teeth, with strong walls, and not into teeth that were very much decayed and having frail walls, and with the enamel standing without underlying dentine to support it, as has been done so extensively under the new dispensation.

There is one other thought to be considered in our estimate of contour fillings : that the majority, perhaps, of those that have attempted to make these somewhat elaborate operations have not had the skill to do them thoroughly ; they have not been skilled manipulators. There have been few examples of extremely skilled manipulators, and in making our judgment upon the failures that we see we should keep in mind the fact. It is also, I think, the conviction of most of us, after ten, fifteen, or twenty years of experience in this new dispensation, that we should not to-day attempt many of the operations which in our enthusiasm we attempted when less experienced.

I wish simply to add my testimony to what has just been said, that contour filling is the ideal filling, and, with such modifications and such limitations in regard to the strength of the material you are dealing with, should be the approved and accepted method of work ; and, although it does not last so very much longer than the wide separations and flat fillings, while it does last it is a comfort to the patient and a relief from a very annoying condition resulting from wide spaces.

The President. We will now hear from Dr. C. S. Stockton, of New Jersey.

Dr. Stockton. Mr. President and Gentlemen : There must have been enough in a paper of an hour and three-quarters length to have furnished material for discussion a whole afternoon, but, unfortunately for myself, I was unable to hear it, therefore I cannot discuss it very much. I regret it exceedingly, because I am sure the paper was a good one.

As Dr. Atkinson said, nature gives us an ideal, and I believe we should follow it as far as practicable. When I began the study of dentistry, my preceptor taught me an entirely different mode of treatment, which was the cutting away of the tooth to be filled, making wide spaces between the teeth and leaving large V-shaped spaces. When I came into a practice of my own, I determined that that was not the proper way to treat teeth, and from that day to this my practice has been to restore as near as I can the form that nature gave. We all recognize the fact that there are times when that is almost impracticable, from the weakness of the patient and inability to stand the fatigue incident to such operations. Many patients have gone out of my hands whose teeth I would have been delighted to treat in that manner, but it was practically impossible. I gathered from the paper last night that the doctor advised in such cases another kind of treatment. There are other materials besides gold, and those you must resort to in the cases I speak of. Gutta-percha may be used for the time being.

The only point that I wanted to make this afternoon was that we should restore, as far as we can, what has been lost of a tooth and bring it back to nature's form. I wish to say to those in the profession who are afraid to cut away tooth-structure, that it is a great mistake. Oftentimes you fill teeth on the approximal surfaces, and they come back to you in six months or a year, and you find that decay has taken place around your fillings. If you had cut away sufficient tooth-structure to allow the metal of the two fillings to come in contact instead of tooth-substance, the fillings would have remained intact and decay would have been prevented. Do not be afraid to cut away tooth-structure.

The President. We will now hear from Dr. Barrett, of Buffalo.

Dr. W. C. Barrett. I was not aware, Mr. President, that I was to be called on to speak upon this subject. I do not think it is profitable to thresh over old straw. This paper has been considered by men more competent than I am, and it is a work of supererogation for me to attempt to discuss it. I prefer to go outside of this field and gather some new straw and thresh that.

I am a believer in types. I believe that there is a grand type, and we might go back farther and say there is a grand archetype of almost all things. I am a firm believer in the wisdom of a Supreme Being, and in that manifestation of it which we call the type, or the natural condition; and it seems to me that all that is necessary to understand or comprehend is to find out what is the natural and normal condition, and then to work to that type as exactly and positively as it is possible to do.

In the relations of the teeth we have certain spaces between them, and, as a general thing, contact in certain places. For what? For the very purpose of preventing septic conditions through the formation of pockets by the jamming of the food down through these spaces. Then if a portion of a tooth is destroyed through decay or accident, and it be possible to restore the typical shape of that tooth by filling, that is the best thing we can do. What more is there to do? What more can be asked, or what less? Study the types of the teeth and the correlations of the one to the other, their dependence one upon the other, and you will better understand how to treat them.

I was not able to hear the author of the paper very well while he was reading; whether from my own dullness or his indistinct utterance, I could not follow him closely nor catch some of the points. Yet I think I got the general scope of the paper, and I cannot agree with him in some of the principles laid down. Undoubtedly there are exceptional cases in which restoration of the type or contour of a tooth is impracticable, whether that be from the inability of the patient to undergo the fatigue of the operation, the frailty of the tooth itself, or the incapacity of the operator; in such circumstances it would be folly to attempt the restoration, but as a general rule I think we should restore a tooth to its primary condition as nearly as we can. So the study of types teaches me, in all cases where it be practicable, that the restoration of the contour of a decayed tooth is the most desirable of all things in operative dentistry.

The President. I see that Dr. Curtis, of Syracuse, has been quite interested in this discussion; we will be very happy to hear from him.

Dr. G. L. Curtis. Mr. President, I could not help thinking, while listening to Dr. Allan's paper, that if its object was to elicit discussion on the methods of operating as practiced twenty years ago, with the view of showing the advancement in the science of dentistry, he has achieved a great success. For a man to exhume and revive a principle in practice from which every observing dentist of to-day has seen the ill effects, and is now battling with diseased conditions of the mouth that have arisen from such operations, such as face filling, is almost absurd. If he would consider alone the mechanical injury it is to the patient to cut away the teeth and fill them as advocated by him, I think it would be sufficient to induce him to make contour fillings. When the teeth are cut away until they resemble the top of a picket fence, the chances for proper mastication of food are greatly diminished; with the teeth so impaired there is great weakening of the system. The human race is degenerating rapidly enough without the aid of the dentist as suggested by the essayist. Common sense is said to be a very good thing for a dentist to possess. Educated sense I should think was by far better. I advocate the system of contour fillings, and cannot see what a man can be thinking of who does not adopt it. As Dr. McKellops happily remarked, "If the dentist has not the ability to do such work, he had better abandon the case and send the patient to some one who has." It is often from lack of mechanical skill and good judgment that these operations are not performed. Where the face-filling operation is adopted, the result is pressure of food upon the gums, which leads to discomfort of the patient and disease of both gums and jaw ; this alone ought to convince men of the importance of contour filling and the necessity for restoring the teeth to their original form. The nearer we imitate nature, the nearer perfect is our work. A little time may be saved by cutting away the teeth and inserting flat fillings ; but when we come to see the alveolar abscesses, the pyorrhea alveolaris, and the recession of the gums, etc., that follow, is it not enough to warrant a change in the manner of filling? It does not seem possible that the method suggested by the author of the paper is largely practiced to-day. Like Rip Van Winkle, Dr. Allan has either been asleep and waked up for this occasion, or else he is not a progressive dentist.

I am in sympathy with the larger part of unfavorable criticism to which the paper has been subjected.

The President. Gentlemen, I will now call upon a member from New York, Dr. Ottolengui.

Dr. R. Ottolengui. Mr. President and Gentlemen : Without wishing to be invidious to the gentlemen who have been discussing the question, I would like to say that, whilst I do not agree with Dr. Allan, I could not help feeling that he must be very much gratified by the fact that most of what has been said in opposition to him has been a mere expression of opinion, much of it based on the special plea that the gentlemen did not hear the paper. As I listened attentively and heard all of the essay, I should like to call your attention to a few points brought out by the doctor and endeavor to combat them.

The argument that we should restore to the original contour is very good, but it is not always essential to do so. Generally, I think it best, but the mere fact that there *is* a normal type is not sufficient reason for us to restore it in all cases. It may happen that the remaining tooth-structure is inadequate to support the superstructure of foreign material. The question then is resolved into this : Does the man who puts the gold in the teeth know how to place it in so that the frail walls will not be called upon to sustain the filling? I suppose no one would use gold in a "too frail" tooth. It is not impossible nor necessarily unwise to fill frail teeth with gold, provided they be not "too frail." It is a question of judgment whether a tooth be too frail or not. The principle advocated, that contour fillings should not be made in frail teeth, should of course be as true in one part of the mouth as in another, if it be true that such a filling endangers the subsequent welfare of the tooth. Take, then, an upper central incisor, where a large corner has been destroyed by caries. I would ask Dr. Allan whether he would put a "flush" filling in such a tooth? If it is true that a bicuspid must be filled with a "flush" or "face" filling, is it not equally true that with an incisor the same would hold good, and that we must put in a ''face'' filling, leaving a wide space in the front of a man's mouth, as I have seen done by flush-filling operators? In the light of the present, would that be counted good practice?

In regard to the matter of cleavage, the doctor said that the union between dentine and enamel is so poor that where but little enamel is left at the cervical border the hammering of the gold during the process of filling would cleave it off. He showed a lot of specimens to illustrate that. Most of the specimens showed fractures of the enamel at the neck of the tooth. Is it not possible that these fractures were produced by the forceps in extracting these teeth? In selecting teeth for implantation, I have looked sometimes for several days and been unable to find a tooth which has not been thus marred by the forceps. Again, these specimens are ground sections, made, of course, from teeth out of the mouth. Dried teeth out of the mouth are naturally more friable than teeth in the mouth. There are three classes of teeth: dried teeth out of the mouth, live teeth in the mouth, and teeth that are only partly alive because only the cementum is alive. With the first class of teeth we have little to do, since we seldom fill teeth out of the mouth. The third class we often find in the mouth, as, for example, where the natural crown is lost and we are about to substitute an artificial one. If it is true that the enamel will break away from the dentine so easily, why is it that we must invent instruments with which to remove it in crown-work?

Another point, the leaving of spaces. The so-called self-cleansing space is a delusion and a snare. There is more food left in such spaces than where contour work is done, simply because more food can get in. Then, again, if in the treatment of pyorrhea alveolaris we find it essential to a cure to fasten or bridge the teeth together to avoid movement, might it not be reasonable to claim that by making V-shaped spaces we superinduce pyorrhea? By removing the points of contact the teeth are wedged this way and that by the impact of food, so that an inflammation of the gum margin and finally of the whole socket is produced. I have seen it in the acute stage, and have relieved the disturbance and aborted the disease by replacing the flush filling with contour work.

As to the matter of time, it is not always necessary to take up so much time. With the judicious use of oxyphosphate as the basis of the filling, a contour can be produced with scarcely more gold or more time than is expended on the flush filling.

Dr. S. C. G. Watkins. Mr. President and Gentlemen: I cannot discuss this paper, because I did not hear it. I sat back a considerable distance in the room, and was unable to follow the thread of the paper at all. I take it, from the discussion this afternoon, that the paper bore almost entirely upon flush fillings, and that the gentlemen who have been speaking upon it are strong advocates of contour fillings. I have frequently told my patients that I prefer to make my reputation on a filling that is flush or slightly rounding, and have them return to me in a few years and say that filling still remains there, than to put in a beautiful contour filling and have the patient in a year or two return and say the filling is out, or the tooth has decayed around it. I have practiced both methods. There was a time when I practiced contour filling almost entirely. That time has gone by. For the last five years I have been making fillings which are about half-way between the flush fillings and the extreme contour, making them rounding, not flat, yet not building up to the natural shape entirely, as I believe the extreme contour will not stand the strain of mastication; and when I see the work return I am proud to say that I am not the enthusiast on contour work that I was at one time.

I believe the paper last night referred to Dr. Perry. Dr. Perry used to be a strong advocate of contour filling. At the present time I believe he is not as strong an advocate of the extreme contour method. If I am wrong the doctor will correct me. The fillings fail generally from the cervical wall; that is the weak point. In putting in cohesive gold and building extreme contour work, we cannot always be positive of the condition of the cervical wall after we have malleted the gold in. In many cases of frail teeth it is not in the condition we would like to have it and expect it to be. That is the vulnerable point. But by using soft gold for part of the filling we can be sure, in my opinion, that it will be in better condition ten years after it has been put in than it would be if it were the extreme contour work. I have simply had reference to the bicuspids and molars, of course. I am a strong advocate of contour work in the incisors and cuspids.

The President. Dr. Perry's name has been mentioned. He is here to answer for himself.

Dr. S. G. Perry. I could not be present to hear the paper last evening, and of course I cannot undertake to discuss it. There are many factors to be considered in discussing the general subject, and I do not feel at all like undertaking it. Perhaps it would be proper for me, however, to express my convictions in a general way. I learned from a gentleman who heard the paper that its general tenor was in favor of flat fillings, and that it might be taken to a certain extent as a plea for flat fillings. You may know how I feel on that question when I say to you that I was surprised somewhat, and a little pained, when I learned that Dr. Allan had taken that position. I suppose I had flattered myself a little too much in assuming that other men thought as I did. I have had such firm convictions on the subject, and thought I saw the whole question so clearly, that it seemed to me that everybody else must see it in the same way.

In the interest of the young men in the profession, I was pained that this question should assume this form. I do not want them, through such teaching, to go through what I have gone through to get what it has taken me nearly twenty-five years to learn. We sometimes can take the experience of others and profit by it, but as a rule we have to learn for ourselves. That implies that a great many young men may follow the teaching of the paper, and try to find for themselves what is the best way, and it may be many years before the errors will be seen, and much longer before the injury will be repaired. I commenced in the early years of my practice to make contour fillings, under Dr. Varney's influence, as well as under that of Dr. Atkinson and Dr. Dwinelle. For reasons which have been elsewhere given, after the publication of Dr. Arthur's book I practiced the permanent separation of the teeth, growing bolder and bolder as I went on, and having less regard for the shapes of the teeth; but I soon began to see the bad results of the work, and I became convinced that there was nothing for me to do but return to contour operations, which I did quite a number of years ago; and I assure you that I am firmer in the faith than ever before. As I grow older and work harder and see more of the needs of our patients, I am more convinced that our work should be more strictly in the direction of the restoration of the natural shapes of the teeth. I think we should regard with a little more reverence nature's work, and hold in a little more importance than we do the types or shapes of the teeth. I am very ready to say that I should think it foolish to undertake to contour a filling in a tooth that stood alone. I do not want to be misunderstood, and considered as practicing contour fillings for the sake of contour fillings; I do it for the purpose of keeping the teeth in position and protecting the adjacent tissues, whether I fill with gold or some other material. It is not the material used, but the principle, that is important. I would not advocate the filling of frail teeth with gold, particularly in the mouths of young people; but I do hold that the fillings should be contoured generally, whether we use gold or a plastic filling, as zinc phosphate or gutta-percha. I think we should keep in mind the idea of lateral support and the natural relations of the teeth. In that sense I am a strong contourist. There are conditions where teeth have lost an adjacent neighbor where I would make a space, and make it large, because I would know that in a few years' time that space would widen. I would not contour a second bicuspid when the first molar was gone. Men should not go to the extreme in contouring for the sake of the principle. For Heaven's sake, let us have a little horse sense in filling teeth. That the preservation as far as possible of the types or natural shapes of teeth will be hereafter the accepted and general mode of practice, I believe to be as inevitable as that two and two make four. If men who work upon the teeth will look on them with a little more of the feeling of the artist whose life is devoted to his work, and who feels that he gets sufficient compensation in following out his artistic ideas, it will be inevitable that in the future they will have more regard for the natural shapes of the teeth.

In reference to the greater difficulty in restoring the contours of the teeth, I think it is not much harder after all than the other method. In very many cases of exaggerated spaces the contour may be made by a proper use of matrices ; but they should be used with care, for they are dangerous things if not properly handled. With a matrix properly used those cases can be so simplified as to be made comparatively easy. It really takes but little longer. How many times have I undertaken to fill a tooth with the idea of making a flat filling, and after I got the filling started at the cervical wall I have said to myself, How little more effort now will be required to contour that tooth ! and I have hundreds of times finished such an operation by contouring when I first intended to make a flat filling. I have been impelled by a force I could not resist, and I was not satisfied until the contour was made. When that contour is made, the gum is protected and the teeth held in their natural relations to each other as they were designed to be by the forces of nature ; and whether we call those forces of nature blind or intelligent, it was that something that built them up and arranged them in that peculiar form, and we must regard that form and arrangement in our work. If we would do work that is creditable, we must emulate the old masters in art,—the great sculptors, the great painters, and the great violin-makers,—whose great productions were the result of genius combined with a devoted love of their work. They worked for the love of their work, and we see and enjoy the results at the present day. If we had a little more of the same feeling in the work we do for our patients, and a little more reverence for the natural shapes of the teeth, a little more regard for the beauty of the marvelous and wonderful structures that we work upon, and try to restore them as nearly as we can to their natural and perfect condition, what a compensation in future years would we have, aside from the money we receive ! Then, gentlemen, if you charge for your operations a little more on the basis of time spent, which is the true basis, and make a perfect and artistic operation, how much better it will be for the patient,—how much more they will get in return for what they pay! Devote yourselves to your work as a work of art, and if it takes a day to perform an operation, if you do it as Dr. McKellops has described, there will be no deaths in the family and no crape on the door because of it.

I insist upon contour fillings in my practice, and I have not seen people going away from my door in an ambulance or carried away on a stretcher. It has been hard work for me; it makes my back ache, and I feel the effects of it probably more than my patients; but that is my funeral, and they need not worry about it.

Now let me say one word in the matter of the use of gold in contour filling. I know I shall create a smile when I say I use a great deal of Watts's crystal gold No. 1, which is the softest form. This gold carefully used will help you very much, as it is a really good material for making contour fillings. I do not wonder that some gentlemen have been discouraged in making contour fillings if they persisted in using hard cohesive gold. Crystal gold No. 1 is soft, works much more agreeably, and when the filling is finished you get the effect of cohesive gold,—a remarkably smooth surface that will remain and not chip off or become ragged or pitted as the years go on. It packs well and finishes finely, and makes a surface that keeps. I use small pieces and light pressure. It is bad practice to use large pieces and attempt to hurry with it; you do not make a tight fit against the wall of the cavity.

In the matter of the care of children's teeth, I consider it of the greatest importance that the shapes of the teeth be kept, whatever material may be used, so that the teeth may be held in the arch in their proper positions while the permanent teeth are being developed. I have seen a great deal of harm done by thoughtless and heedless operations upon the teeth before the wisdom-teeth were erupted, and it was a discouraging task to undertake to correct it; so great a task that it often might be questioned whether it is wise to undertake it at all.

So far as the general tendency of our profession is concerned, it must inevitably be, it seems to me, in the direction of contour fillings. That must eventually be the position of all earnest and thoughtful men in the profession. I look forward to the time when such a question as this will not be raised at all.

I may have misunderstood the tenor of the paper, and what I have said I wish to be considered as a discussion of the subject on general principles.

The President. Dr. Dwinelle is an authority on this subject, and I know he wants to talk to you. I will call upon Dr. Dwinelle, of New York.

Dr. W. H. Dwinelle. Gentlemen, if you will allow me to lay aside my constitutional modesty, which everyone recognizes, I will presume to use the personal pronoun I occasionally. I have a book in my hand in which a certain doctrine was put on record between thirty and thirty-five years ago, with illustrations, and, if I am to believe the contents and the genius of the paper I refer to, I was the first *contourist* ever born. In this book, the *American Journal of Dental Science* of 1855, I advocated the use of a plastic gold originated and developed by Dr. Watts and myself, by and with which I was enabled to construct contour fillings for the first time in the history of our profession. I early recognized the great fact that our profession was one which had for its object the restoration of humanity, and especially the restoration of human teeth, and the first contour fillings I ever saw are illustrated and described in this book. I had the good fortune to engrave the illustrations myself, and can vouch for their correctness. I early recognized the great truth that the nearer we get to nature the nearer we approach to perfection. She is the great ensample which we may continually approach yet can never reach. It is the constant effort of all art to approach nature, whether it be in sculpture, in painting, in mechanics, or in anything we have to do with. It is particularly true as applied to humanity and to our maxillæ. When we undertake to say that contour fillings are against the principles of nature, or that it is not good doctrine to advocate them, we are getting just so far away from nature and her examples ; we question or impeach the wisdom of Almighty God when we utter such doctrines. We have a great example continually before us to approximate to. In the matter of contour fillings we simply restore the form the Almighty established from the beginning for good and wise purposes, many of which we understand and recognize, but there may be many more that "we wot not of." So we should be strictly religious in this respect, and believe that not an angle and not a curve was put there unnecessarily, unwittingly, or unwisely. So I am an advocate of contour fillings in the extreme sense, and always have been. I have ever been thoroughly imbued with this doctrine, and as my good friend, Dr. Perry, has said, so far from falling from the faith in the slightest degree, I grow daily more enthusiastic in this direction. There may be cases where contour filling may not be the best thing ; but those exceptions only prove the rule. I believe that wherever it is practicable to have contour fillings we should have them. It is unnecessary to speak to an intelligent body like this of all the advantages which arise from contour fillings, where the surfaces are brought together as the tooth-substance itself was naturally, so that food is not permitted to crowd down between the teeth, to the annoyance of the patient and the detriment of the teeth and gums. I have sometimes, referring to the wisdom of the *contour*, used the figure—like a row of oranges touching each other at the point of their largest diameter, so that while in contact they impinge on the smallest surface. Nature has placed before us an example and model of beauty and symmetry in the teeth which we should follow in our work.

A word in reference to Watts's crystal gold. Because Watts's crystal gold has an existence, contour fillings were possible, and they were never possible before it existed. In the great principle that was developed in the production of crystal gold, that absolute gold is always cohesive, and that one of its inherent characteristics is that it is adhesive, we had presented to us a plastic material which we could build up into independent forms. And so the birth of contour filling came by virtue of Watts's crystal gold, because in making that discovery others followed, and adhesive gold foil came out of it. I defy anybody to show an instance wherein adhesive gold foil was manufactured systematically and continuously before Watts's crystal gold was discovered. After that came adhesive foil in all its modifications. We had the basis of our contour operations in the fact that had been demonstrated, that absolute gold was adhesive. We can qualify it and have it more or less adhesive, gradually receding back to soft foil. Hence we have foil also by which we can build up independent forms.

In the treatise within this book I was the first to demonstrate and advocate the use of retaining-screws, the matrix for building up approximal fillings, cap crown- and bridge-work, and other improvements in our art, most of which have been patented by unscrupulous persons, who endeavor to make us pay a price for that which belongs to ourselves and not to them.

The President. Dr. Allan will now close the discussion of this subject.

Dr. George S. Allan. The first thing I want to say is this, that no one regrets more than I do that my paper was so long. It was far too long, and should have been cut in two. Unfortunately, in addition to the paper being so long, my voice, for some reason, was beyond my control : I could not raise it, and therefore many of you failed to catch the ideas which I wished to convey.

Now, I do not believe there is anyone here who has enjoyed and appreciated this discussion half as much as I have. But I am most sorry that the meaning of my paper has been entirely lost. Read between the lines, I intended my paper to be a strong argument in favor of contour work. I wanted that idea to go forth to the profession as the one I had adopted in practice. I did say that Dr. Perry's paper was top-heavy, simply because Dr. Perry gave you all the good points and reasons why contour fillings should be adopted, but failed to tell you when to be careful and discriminating. I acknowledged every one of the points that the contourists have made ; I accepted them and said they were true ; that we should not take a false ideal and make it take the place of nature's model. I could not have placed it in plainer terms than I did. But I do think it is the greatest mistake possible to have an idol. *Noli me tangere :* don't touch me. That is the meaning of almost nine-tenths of the articles that you find in the journals on contour fillings; my idol is so sacred to me, don't you touch it, don't you tell me whether it has any bad or weak points, or that it is not able to cure every ill.

I intended that paper to be just what it is. It has been suggested that before printing it should be edited and shortened, but it will be published without revision. I am willing to be judged by it as it stands.

Now, I am certain I have this ideal of contour fillings fixed in my mind as strongly and positively as any man present; it is just as much the goal that I want to reach in every possible case as it is that of the most enthusiastic contourist among you. But is it so foolish to point out the cases where the danger-signal is flying, or to insist on a common-sense observance of facts and laws that control, for weal or woe, all operations of this kind? I certainly do believe it is far more reasonable to consider the weak points of an operation, as well as the strong ones, than to shut your eyes against them. The wise way to avoid difficulties is to look them squarely in the face. The wise time to avoid them is before you meet them.

In all the discussion of this paper not one person except Dr. Ottolengui has taken up a single point that I mentioned. Every other speaker has, directly or indirectly, indorsed and upheld them.

I asked Dr. Ottolengui to let his drawing remain on the blackboard. Slight things sometimes show a person's knowledge or the lack of it. The doctor said this represented a triangle of the enamel. It does not represent anything of the kind. The drawing to represent the enamel should be about here [indicating]; that enamel should be there, this little triangular piece. It would run in that way, and the doctor should not have made so queer a mistake.

Now, granting that this is a section of a molar at the neck of the tooth where the enamel commences to taper off, Dr. Ottolengui says that possibly this separation of the enamel was due to the use of the forceps in extracting. I can show the doctor many specimens that have not only the enamel split off, but where actual decay had commenced, and necessarily during the life of the tooth in the mouth.

Dr. Ottolengui says he finds it difficult to remove that little triangle of enamel when he is putting on crowns. That is a most astonishing assertion to me. The slightest force possible with a little scaling instrument takes it all off and leaves the dentine bare. You have to cut off that enamel in putting on a crown, and it comes off so easily and readily in my practice that I cannot understand what the doctor means.

I am very glad that this discussion has taken place. I am very glad that the profession, as stated in my paper, shows a well-marked growth in the line of contour work ; and as we progress, as our instruments become more perfected and our methods of manipulating gold more finished, as our knowledge of materials and the basis of the superstructure increases, more and better contour work will be done by us all.

I believe an allusion was made to the average amount of contour work with reference to failures. I did state that it was my experience that I had noticed, where I thought I had unusual advantages for comparing fillings that had been made by the profession at large, that more failures occurred in contour work than where flush or face fillings had been adopted. That is not my experience only ; I have taken a great deal of pains since commencing this paper to ask my professional brethren the results of their observations, and have found that I am well supported in my views.

Please accept my thanks for your patience and kindness, for I know I have tried both sorely.

The President. Dr. Crouse, of Chicago, has a few words to say to you.

Dr. J. N. Crouse. Mr. President, I did want to say one word upon this last subject, and that is that the most important part of this discussion, the most important feature in the success of contour work, has been left out. That is whether you can get your patients to keep the teeth clean or not. If they do not keep them clean, any kind of work will fail.

The President. Gentlemen, this will end the discussions of this meeting. In the name of the society, permit me to thank the gentlemen who have taken part either in the discussions, the clinics, or the reading of papers.

This meeting is now adjourned.

The regular monthly meeting was held on Tuesday evening, February 11, 1890, in the New York Academy of Medicine, No. 12 West Thirty-first street. The president, Dr. A. L. Northrop, in the chair.

Dr. V. H. Jackson, chairman of the Clinic Committee, read the following

CLINIC REPORT.

A stated clinic of the society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street. Dr. J. Adams Bishop, of New York, showed the models and obturators of six practical cases of cleft palate. The doctor recommends that the whole plate, with extension, be made of hard rubber. He also showed a case of reparative surgery, which was demonstrated with plaster models of the face. There was an extensive loss of the superior maxilla from necrosis, and a considerable loss of the soft parts. A plastic operation was first performed by a surgeon, and then an ingenious device of rubber was made to supply the place of the lost bone. He also exhibited fourteen dental splints made of rubber, and one shown in the mouth was so constructed as to clasp the lower teeth and articulate with the teeth above. . . . Dr. C. B. Parker, of Brooklyn, N. Y., demonstrated the working qualities of his "alloy cement." It is made by mixing an alloy with an oxide and then treating with phosphoric acid the same as in ordinary cement. The doctor is confident that this method adds to the wearing quality. Its surface is much like platinum in appearance. . . . Dr. E. B. White, of Philadelphia, inserted two gold crowns in the mouth of Dr. Brenizer, of Philadelphia, one of which he made at the clinic, and demonstrated his method of taking an impression and articulation at one time, in plaster, for making bridge-work. He also showed a full upper practical case. . . . Dr. Horace Dean, of Jersey City, described his method of capping exposed pulps with copper amalgam, the results of which, with more extended experiments, will be reported at a future clinic. . . . Dr. Miles H. Dodge, of New York, showed a pair of curved scissors that he had made fifteen years ago to remove the gum from over erupting teeth. He also showed a Physick's elevator that he had made in 1867, and also some burs and drills with flexible shanks.

Incidents of Office Practice.

Dr. Ottolengui. Mr. President, it is seldom that we can get a thorough history of a case of pulp-capping, and I think this case which I wish to report may be of interest. A lady, aged thirty-two, came to me in May, 1882, eight years ago. I found in a lower second molar a grinding-surface cavity, and the pulp slightly exposed. Capping of pulps was in vogue at that time, and I capped this one by flowing gutta-percha and chloroform over it, and filled the cavity with oxyphosphate. The pulp was actually exposed. In July, 1884, she returned to me to have the filling replaced. My first idea was to fill with metal, leaving a portion of the oxyphosphate in the tooth ; but having a curiosity to see what condition the pulp was in, I took out the oxyphosphate and the gutta-percha, and found the pulp not exposed ; it was covered with new dentine. I refilled the tooth with amalgam of some kind. Within the last week I have seen the patient again. The filling has served until recently, when a portion of the lateral wall broke down. She came to me with the filling somewhat loosened, an abscess being at the end of the root. I took out the filling and found a large mass of new dentine filling the pulp-chamber, which I burred out with considerable difficulty until I was able to guess where the pulp-chamber was. There was perfect access to it, —a good chance for me to drill down into the canals if I could find them. I drilled down into the dentine a distance that would be two-thirds the ordinary length of such canals, in each root, and I failed to find anything but secondary dentine filling the canals. I was afraid to risk going farther, and I refilled the tooth. That is all. The pulp was capped, the canal filled up with new dentine, and an abscess developed.

The President. Gentlemen, I have the pleasure of introducing Dr. Harrison Allen, of Philadelphia, who will give us a paper this evening on the " Clinical Conditions common to the Throat, Mouth, Nose, and Ears."

Dr. Allen then read his paper, of which the following is an abstract :

He stated that it may be accepted as an axiom that structures which are associated anatomically will be found to be associated clinically also ; that a portion of the mucous membrane found within the head is a natural anatomical division of this membrane ; therefore its several parts form a system. This system Dr. Allen denominated the " cephalic mucous membrane," and held that the clinical condition associated with it can be best interpreted by remembering the normal uses to which it is habitually put.

After analyzing the acts of speech and singing, Dr. Allen spoke of the clinical condition of vocal fatigue, and directed attention to the very numerous and apparently dispersed sources of origin of this condition. He claimed that they could be detected in diseased states of the anterior ends of the middle turbinated bones, in the roof of the pharynx, in the palato-pharyngeal muscles, in the sides of the tongue, as well as in strictly laryngeal states. He next proposed a subdivision of the dorsum of the tongue into clinical regions ; he recognized four of such divisions and restricted them to anatomical limits. He also spoke of the disposition of the fur on the tongue to be localized to one or more of these divisions. The subject of what Dr. Allen called " referred sensations" was next considered. He defined such sensations as those which are located by the patient at points remote from their sources. The level of the hyoid bone was often the place of referred sensations which had their origins at almost any part of the cephalic mucous membrane. The distress attending disease in the nasal chamber is often referred to the tip of the tongue ; the irritation of the tonsils is often referred to the ear, etc. Among the curiosities of the sensations pertaining to the teeth were included vertigo and epileptiform convulsions. He next spoke of the reflexes within the cephalic mucous membrane, especially of nasal catarrh, lachrymation, and epistaxis, as being excited by an irritation of an exostosis on the root of a tooth. He had found pyorrhea alveolaris to be a cause for nasal catarrh. He claimed that empyema of the maxillary sinus appeared to be on the increase, and found on more than one occasion that the defective tooth which was exciting the inflammation of the sinus was one upon which the practitioner had expended much time and skill. Dr. Allen said that while it was not a pleasant thing for a physician to suggest to a patient that an apparently valuable tooth should be extracted, nevertheless he gave the alternative that would be in an equal degree annoying,—that so long as such a tooth was retained an offensive, if not a dangerous, discharge was incurable.

The lecturer next spoke of the significances of the so-called Hutchinson's tooth, concurring with many dental observers that it was not necessarily a sign of congenital syphilis. The remainder of the address consisted in a detailed description of the restoration of the senses of taste and of smell in a young adult after an operation which suddenly brought into play these two functions. The patient was a woman twenty-six years of age, who had congenital atresia of the posterior nares. It was found to be interesting that these two sensations for which the patient had been denied use were found to be well developed and efficient the moment the physiological conditions were presented for their exercise.

Dr. Allen during the reading of his paper added the following remarks :

In speaking of the connections between the forms of teeth and vitality he described a maxillary molar whose crown is oblique to the axis of the dental arch instead, as is the rule, of being at right angles to it. The general form of the grinding-surface is that of an ellipsoid. All teeth posterior to the ellipsoid tooth are degenerate, but not monstrous. The ellipsoid tooth when of a low crown (viz, of a brachyodont form) is always expressive of diathesis. He continued :

I will illustrate what I mean by an ellipsoid tooth, which is a word of my own making. [Drawing on blackboard.] When an ellipsoid tooth is extracted, the roots are nearly always found to be confluent ; so when you see that form of tooth you can determine what the roots are,—an evident advantage in the performance of the operation of extraction, for it enables the practitioner to determine the direction of traction, the degree of force to be employed, etc. I have unfrequently seen an example of such a tooth which did not have confluent roots; practically one root, although there were traces of the other roots in the single one. I claim that all individuals showing the ellipsoid second molar have had impaired vitality ; there is generally present an inheritance of disease, either of syphilis or scrofula. They are degenerated teeth.

Discussion.

The President. Gentlemen, the paper is before you for discussion.

Dr. W. H. Dwinelle. Mr. President and Gentlemen : I generally wait until some one else has spoken, but on this occasion I would like to speak first. I feel that our professional views have been enlarged and broadened by the paper of to-night. The writer has presented new views of higher and better things for us in the future ; he seems to have given a new cast to our horoscope ; I trust we shall profit by the lesson. I have long since maintained that ours embraces more within itself than any other profession. We have to do with the organization of man to a larger extent than any other ; we have to do with man's restoration to his lost prestige. We have done much to that end, and to-night it seems that we have taken a larger step than ever before in that direction. The matter of taste and smell in this connection has been treated in a very interesting manner, and we all recognize the truth of what has been said. I hold that nobody can have a perfect sense of taste unless the nasal fossa is open for the passage of air. We taste imperfectly when it is closed from any physical cause,—a cold or anything of that kind. We often hear it remarked of a person having a cold or other nasal difficulty, that he talks through his nose ; but, on the contrary, he cannot talk through his nose, because the circulation of air through the nasal fossa, which is essential to perfect speech, is obstructed or closed. The free passage of air through the nose is also essential to the sense of smell. The tongue tastes differently according to the manner in which objects of taste are presented to it. For instance, we taste in one manner at the tip of the tongue, in another manner on the surfaces or sides of the tongue, and in still another manner down in the region of the base of the tongue. We taste articles which contain much of the essential oils at the tip of the tongue ; mint and medicines of the aloes order we taste at the back part of the tongue and the throat. Place a particle of aloes on the tip of the tongue and we perceive no essential taste, but if it goes into the back of the mouth we taste it with a shudder, and think of "the gall of bitterness and the bonds of iniquity !" Milk, too, is tasted almost exclusively in the back of the mouth ; in fact, in our first experience with and acceptance of it, all of the anterior part of the tongue serves as a *coiled conduit* to convey it to the posterior part of the mouth and base of the tongue, where the first sensation of taste is realized.

The matter of our varied tastings at different parts of our mouth has been the subject of study by several of our most distinguished artists. David Col and those of the Dusseldorf school of painters have given us most interesting examples of their conceptions of this human quality in their "Wine-Tasters." They have pictured their subjects in a wine-cellar with filled glasses in hand. The thin-faced nervo-sanguine man has taken his modest swallow of sherry in his mouth ; it plays a moment about the tip of his tongue, and then as he passes it backward and downward he lifts the palatine velum that he may distil its volatile bouquet over the nerves of the nasal fossa, when he has finally *tasted* and is prepared to pronounce upon the quality of the wine. The full-cheeked, rotund lymphatic fills his mouth, covering its entire inner surface ; finally, with sleepy eyes, lets a portion of the fluid exude from its corners ; in this way he critically tastes his favorite Burgundy. Another tests his brandy by washing it with many a gushing stream backward and forward within his mouth ; while a fourth, and he, perhaps, of Irish extraction, with no small measure in hand, filled to the brim with illicit whisky, literally pours it down his insatiable maw with one Niagara gulph, when he has tasted a long taste !—all demonstrating taste differently at different parts of the mouth, especially of the tongue. A little experiment will show us, to our surprise, that all foods, condiments, and liquids are best appreciated at different localities of that organ.

With reference to obstructions of the nasal cavity affecting taste and smell, I remember a number of cases where these senses were suspended for years on account of disease of the antrum, and when the antrum trouble was removed both taste and smell were restored.

With reference to reflex action, we all certainly must recognize it in our practice, and I have no doubt we will hereafter profit by the facts presented here to-night. The irritation caused by deciduous teeth we meet with constantly, and as constantly we have recourse to remedies for its cure. In the matter of abscessed teeth, which was referred to, we all know that, as a rule, they discharge outwardly. If the abscess discharged inwardly, most unhappy consequences would be likely to occur.

The number, character, and origin of the nerves employed and distributed about the organ of taste still remains a matter of controversy. Yet all, I believe, agree that the glosso-pharyngeal, a branch of the eighth pair of nerves and terminating upon the mucous surfaces of the fauces and back part of the tongue, and the lingual branch of the fifth pair, which mostly supply the upper part of the tongue, and is copiously distributed to the papillæ near the tip, constitute the chief nerves by which impressions of taste are realized in the great sensorium.

Dr. M. L. Rhein. Mr. President, it afforded me pleasure to listen to the paper this evening, drawing our attention as it did so pointedly to the intimate connection of the oral tissues with other portions of the human system. The entire oral region, the parts and boundaries of which were so plainly delineated in the opening remarks of the essayist, present a province belonging exclusively to our specialty, but it is a portion that, with a few exceptions, has been neglected almost entirely by the profession; and it is in this region that the advancement of our specialty is bound to take place to a very great extent.

There are two or three points which the essayist brought out which do not appear to be in accord with my experience. His conclusions do not agree with certain facts that I have noticed in connection with these conditions and their treatment. He has devoted the greater portion of the paper to reflex action resulting from pathological conditions existing around the teeth, whether arising from alveolar abscess or pyorrhea alveolaris. Now, the majority of us, as specialists, have recognized the fact that there is, to start with, a great differentiation necessary to be made between the forms of irritation that we find existing here, whether we have alveolar abscess or some other pathological symptom. If we have alveolar abscess, his remarks, as a whole, are very true. This is pre-eminently a local trouble, and can produce all the manifestations which he so vividly portrayed; but if it is such a pathological condition as we see manifested in pyorrhea alveolaris, which is exactly what he ascribes the nasal troubles to,—calling pharyngeal or antral disturbance symptoms of pyorrhea trouble,—we must go still farther back and say that these pyorrhea troubles are simply symptoms of a disordered condition of some other portion of the system. There is malnutrition reigning around the gums and the alveolar process, which is nothing but local; we can cure it by the local treatment which is laid down to us *without* the extraction of the teeth. Those local catarrhal symptoms produced by exudation of pus can very readily be carried along the mucous membrane to the pharynx or nasal structures, and be generally disseminated in that way; but I trust that we have made a further advance in the cure of this trouble; and I disagree with the essayist in his remarks against too much conservatism in the saving of this class of teeth. If we can reach the seat of the alveolar abscesses, the cause of the trouble, there is no reason why the teeth should be sacrificed, except in some very hopeless cases.

To illustrate another point showing a reflex action arising from some other source than the teeth, I will cite a very interesting case that has been for some years a puzzle to the most eminent and very best specialists in this city. About a year and a half ago a young man presented himself to me with a very bad attack of pyorrhea alveolaris. He was recommended to me by a member of this society who had been his dentist for fifteen or eighteen years, and he had felt that the cure of the pyorrhea was almost hopeless. It was a typical case,—exudation of pus from almost every tooth in the mouth, the gums swollen and painful, and he was suffering acutely. On careful examination into the history of the case I learned that he had a paralytic affection of one side of the face about five years ago. It had taken away entirely the senses of taste and smell for quite a time. He had, or imagined he had, gradually regained these senses to some extent. With the usual treatment his pyorrhea was to all intents and purposes cured, but I told him very plainly that I considered it merely an alleviation of the symptoms, and that any exciting cause would very likely reproduce it. I felt that perhaps a *pathological* condition of the teeth might have been the cause of his paralytic affection, and with that idea in view I investigated in a most thorough manner through almost every tooth he possessed. He had two or three pulpless teeth; they had all been properly attended to, and up to the present time he has not lost any of his teeth. I cannot find any tooth in his mouth in which I have the faintest suspicion of any pathological condition outside of the fact that he will get, and has had, a recurrence of the pyorrhea. Since he has been under my treatment he has had two further paralytic attacks. One side of his face became perfectly cured, and about six months afterward he was paralyzed on the other side. He could laugh on one side of his face while the other side was perfectly mobile, and he used to sleep with one eye open for weeks. He was treated at that time by the very best medical skill in New York, and under electric treatment was cured for the time being. That was last March. During this last summer I saw him, and I advised him very strongly to take better care of his general health, to put himself under a tonic regimen, and take more active exercise. He took the advice, but did not take the remedy. Instead of which he overworked himself,—he is a business man,—and the result was that he had another paralytic stroke on the side which was first paralyzed. Then the pyorrhea started in again. I relate this case at such length because I think it shows so distinctly the direct relationship of the non-nutrition around the sockets of the teeth to the paralytic trouble.

One point further. The doctor in speaking of alveolar abscess recommended the extraction of the teeth, and spoke against conservatism in the treatment of such cases. I want to be very plain and direct in my answer to that statement. We often get very bad complications following neglected cases of alveolar abscess, where they follow the sinuses and where they produce almost innumerable troubles from disturbances of the sockets of the teeth and disturbance of the entire maxillæ; but still in nearly all the cases there is no excuse for the extraction of the teeth. As long as we pretend to be oral surgeons we should put our general knowledge of what we can do in other branches of our calling to effect here, and it is a simple lesson which Dr. Atkinson taught me many years ago. Take the worst case of alveolar abscess that you can get, and you have a diseased condition irritating the surrounding tissue and forming pus around the apex of the root; and all we have to do in such a case is to make an incision down to the portion of the root that is diseased and amputate it, the same as a surgeon would amputate a diseased part, and save the remaining portion of the tooth. It is an operation which I know the majority of the members of this society are thoroughly familiar with, and I only bring it forth in this manner to call the attention of the essayist to the fact that there is a way of conserving teeth in such pathological conditions without resorting to extraction.

Dr. W. H. Atkinson. Mr. President and brethren : it would be in vain to attempt to give an adequate review of the paper and the doctrine pronounced, and rectify or add to the doctrine or practice, without having more definite nominations in our minds, so that we will each have the same mental status to deal with. I do not think Prof. Allen intended to cover the ground so as to teach us to diagnose, prognose, and treat these cases ; but he gave us very interesting details of a number of cases that came under his observation, without the alliteration that would be necessary for us to comprehend just how to make the discrimination. All that respecting syphilitic teeth I am very well pleased with ; his views and my own correspond exactly as to antecedents,—I won't say cause ; that is the difficulty, saying we have found the cause of the malnutrition or malformation when we have only seen evidence of the movements that have preceded the various deformities that have come under observation. So far as we deal with teeth whose life-line has run out while they were lying concealed in their calcigerous cysts, their vitality lost to the ends of the roots, I do not see how anything better can be suggested than their removal. As to the removal of a tooth that has lost the vitality of its pulp, to secure us against reflex action, quite other considerations govern, as rather than *reflex* action it is an *extension* of the retrograde metamorphosis of the parts, for example resulting in perhaps so-called maxillary sinus abscess, itself a misnomer.

The cases spoken of interested me very much as to the high arch and the teeth that were malformed. I should emphatically accept and indorse the remarks of Prof. Allen in regard to the ellipsoidal teeth,—teeth thrown out of line : they agree with my experience and observation exactly. All those I have seen extracted, with one or two exceptions, have shown the peculiar morphological character spoken of. It has nothing to do with anything that can be called contagious diseases, but may be referred direct to pre-natal condition. In medicine, as in morals, we should right a wrong as soon as we discover it is a wrong. The great difficulty is in our classification. Several times the doctor referred to this trouble as being of an inflammatory character, and we would infer that he supposed pus would always be present when there was an inflammatory condition. We are a great deal in the dark about what pus is. We have many times sanies and ichor in connection with pus, and nominate it all pus. In such cases it will be very severe and will generally be propagated in the debilitated condition of the system. Such patients should be kept out of business and given a sufficient amount of exercise to eliminate the sluggish little ponds in the splanchnic structure of the body, which are just waiting to be brought into contact, when, if the system is in a debilitated condition, there is set up a retrograde metamorphosis whereby we get irritation, then inflammation, then suppuration, and other terminations of the inflammatory process. Wherever an individual has sufficient vigor to insure a perfectly developed set of teeth fully erupted, if the pulp does die, clean out the root and fill it, amputating the end of the root if need be, which will save the tooth, so far as that is concerned. I am sorry the time is so far gone that we cannot resolve ourselves into a conversational club and ask Prof. Allen to go to the blackboard and discuss and illustrate each one of the points of this subject, and I feel very sure of being safe in indorsing him as sound in the matters to which he has given so much attention,—the diseases of the upper air-passages and the mouth.

Dr. Allen. Mr. President: In connection with the remarks made by the first speaker I would say that I am glad he finds enough interest in the subject of taste and smell to think that they belong to the field of dental observation. Certain it is that gentlemen of your profession have opportunities that no one else can have to the same degree of testing the sense of taste. It is difficult in general practice to get patients to submit to it. I have often found that persons were a little restive under such inquiries, probably thinking them expressions of idle curiosity; but in the dental chair I think you would have opportunities of testing these senses without the patient's knowledge.

Respecting the nature of pyorrhea, I mentioned the fact, although it may be I did not lay sufficient stress upon it, that the only case I alluded to was a gouty subject. Nevertheless, I assumed that the teeth were operating as exciting causes. I mentioned that as a case of Dr. C. J. Essig, of Philadelphia, and he had advised, independent of myself, the extraction of the teeth. The patient objected to losing them, but we finally persuaded her to have them extracted.

That there is an under-stratum of constitutional conditions in pyorrhea I have already committed myself to.*

As to the extraction of teeth in maxillary empyema, I never decide that question. In every case I have related I was in consultation with a dentist in Philadelphia. I did not order the teeth extracted, but referred the case to Dr. So-and-So: to Dr. Cryer, or Dr. Faught, or Dr. Ellis,—gentlemen whose standing in their profession is sufficient guarantee of the validity of their judgment,—and they have agreed with me as to the extraction of the teeth. Many of my patients come from a distance, and could not remain long for dental treatment.

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* See DENTAL COSMOS for June, 1885, page 329.

On motion, a vote of thanks to Prof. Allen for his paper was passed.

Adjourned. B. C. Nash, D.D.S., *Secretary.*

Election of Officers.

At the annual meeting, held at the New York Academy of Medicine, April 8, 1890, the following were elected officers for the ensuing year: J. F. P. Hodson, president; V. H. Jackson, vice-president; B. C. Nash, secretary; John I. Hart, treasurer; J. Bond Littig, librarian. Delegates to the State Dental Society for four years, F. A. Roy and George Evans; for one year, to fill vacancy, S. H. McNaughton. Executive Committee: William Carr, Delos Palmer, and K. C. Gibson, chairman. Clinic Committee: Sherman B. Price, W. Curtis Deane, and M. C. Gottschaldt, chairman.

B. C. Nash, *Secretary.*

BROOKLYN DENTAL SOCIETY.

At a meeting of the Brooklyn Dental Society, held March 24, 1890, the following resolution was offered and adopted:

Resolved, That a copy of the last section of the report of the chairman of the Clinic Committee, relative to the chloride of methyl spray, be forwarded to each of the dental journals, with the request that they publish the same.

I herewith inclose a copy of said section, and trust you will give it space in the Dental Cosmos.

Louis Shaw, *Secretary.*

[The following is the section referred to.—Editor.]

At a stated clinic of the Brooklyn Dental Society, held at No. 444 Fulton street, Brooklyn, on Monday, March 24, 1890, Dr. M. L. Rhein repeated his clinic with chloride of methyl, and satisfied all present that he has suggested the most efficient and painless anesthetic for sensitive dentine yet introduced. It is undoubtedly better than the spray from a nitrous-oxide cylinder, which was described and demonstrated recently before the Odontological Society in New York. Your committee thinks this agent of so much consequence to us, and the method such a boon to suffering humanity, that it suggests that a copy of this part of this report be sent to all the leading journals, that the matter may be brought to the attention of the profession in a prominent way, immediately.

It has been previously demonstrated that dehydration produces anesthesia in dentine, and that sprays have this effect. But all sprays except this produce considerable pain. The chloride of methyl spray acts so instantaneously that the pain is only a momentary shock at most, and is not complained of by the patient. It may seem that this is a strong report from your committee, but since the last clinic your committee has thoroughly investigated this method and seen it satisfactorily demonstrated in a large number of cases.

INSTITUTE OF SURGEON DENTISTS OF RIO DE JANEIRO.

UNDER the date of June 14, 1889, there was organized, at Rio de Janeiro, Brazil, a society under the name of "The Institute of Surgeon Dentists of Rio de Janeiro."

The list of officers first elected is composed of the following gentlemen: José Gomez de Faria, president; Carlos A. Hastings, vice-president; Aristides Benicio de Sá, first secretary; Luiz Chapot Prévost Filho, second secretary; José Pinto Simões, treasurer; Carlos Koth, librarian; Napoleão Jeolás, editor of the Review.

The society started with a membership of twenty-five, and promises to be instrumental in producing good results for dental science in South America.

The officers may be addressed at the assembly-room of the Institute, Rua Sete de Septembro, No. 62, Rio de Janeiro, Brazil, S. A.

VERMONT STATE DENTAL SOCIETY.

THE Vermont State Dental Society held its fourteenth annual meeting at Bellows Falls, March 19 and 21, 1890. It was unanimously voted to hold the next meeting at Rutland, commencing the third Wednesday in March, 1891.

The following were elected officers for the ensuing year:

Dr. G. W. Hoffman, president, White River Junction; Dr. W. S. Curtis, vice-president, West Randolph; Dr. George F. Cheney, second vice-president, St. Johnsbury; Dr. T. Mound, secretary, Rutland; Dr. W. H. Munsell, treasurer, Wells River. Executive Committee, Drs. A. J. Parker, Bellows Falls; Thomas Mound, Rutland; W. H. Kingsley, Middlebury. State Prosecutor, Dr. G. W. Hoffman, White River Junction.

THOMAS MOUND, *Secretary*, Rutland, Vt.

BALTIMORE COLLEGE OF DENTAL SURGERY ALUMNI.

THE alumni of the Baltimore College of Dental Surgery held a meeting in the college building, Baltimore, Md., March 20, 1890, with Dr. Norman W. Kingsley, of New York, presiding.

Papers were read by Dr. Edward Nelson, of Frederick, Md., and Dr. C. A. St. Amand, of Baltimore.

The following officers were elected for the ensuing year: A. R. Eaton, president; Thomas H. Davy, vice-president; R. Bayley Winder, Jr., secretary, and T. S. Waters, treasurer.

W. W. DUNBRACCO, *Secretary pro tem.*

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE twentieth annual meeting of the South Carolina State Dental Association will be held at the Charleston Hotel, Charleston, S. C., commencing on Tuesday, May 13, 1890, at 12 o'clock M.

A cordial welcome will be extended to members of the profession who may attend.

LOUIS P. DOTTERER, *Secretary*,
No. 74 Wentworth street, Charleston, S. C.

MISSOURI STATE DENTAL ASSOCIATION.

THE twenty-sixth annual meeting of the Missouri State Dental Association will be held at Pertle Springs (Warrensburg), Mo., commencing Tuesday, July 8, 1890, the sessions to continue for four days.

The executive committee, consisting of Drs. J. F. McWilliams, W. L. Reed, and W. H. Buckley, are making special efforts to have this one of the largest and most interesting meetings in the history of the association.

WILLIAM CONRAD, *Cor. Secretary*,
No. 321 North Grand avenue, St. Louis, Mo.

SOUTH DAKOTA DENTAL SOCIETY.

THE seventh annual meeting of the South Dakota Dental Society will be held at Yankton, S. D., commencing June 3, 1890, the session to continue for three days.

F. O. SALE, *President*,
Huron, S. D.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE twenty-second annual meeting of the Dental Society of the State of New York will be held in the Harmanus Bleecker Hall, Albany, N. Y., on Wednesday and Thursday, May 14 and 15, 1890.

The Board of Censors will meet at the Delevan House, Tuesday morning, May 13, at ten o'clock, for the examination of candidates for the degree of Master of Dental Surgery (M.D.S.). No examination will be held during the meeting of the society. Information as to the requirements of the board may be had by addressing the secretary, Dr. Frank French, Rochester.

F. T. VAN WOERT, *Secretary*,
No. 152 Noble street, Brooklyn, E. D., N. Y.

SUSQUEHANNA DENTAL ASSOCIATION.

THE twenty-sixth annual meeting of the Susquehanna Dental Association will be held at the Wyoming Hotel, Wilkes-Barre, Pa., on the 14th and 15th of May, 1890.

The programme will consist of essays, clinics, and the display of dental goods. Members of the profession are cordially invited to be present. V. S. JONES, *Recording Secretary*,
Bethlehem, Pa.

NEW HAMPSHIRE DENTAL SOCIETY.

THE fourteenth annual meeting of the New Hampshire Dental Society will be held in Concord, N. H., commencing Monday evening, June 16, 1890, and continuing until Wednesday noon of the 18th.

An interesting programme may be expected. All members of the profession in the State are most cordially invited to attend.

The Board of Censors will meet on the evening of the 16th of June in connection with the society.

EDWARD B. DAVIS, *Secretary*,
Concord, N. H.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

THE regular meeting of the Illinois State Board of Dental Examiners will be held in the State House, Springfield, Ill., on Monday, May 12, 1890, at 10 o'clock A.M. Candidates for examination will present themselves before 2 P.M. of that day.

C. STODDARD SMITH, *Secretary*,
No. 103 State street, Chicago, Ill.

MINNESOTA STATE DENTAL ASSOCIATION.

THE Minnesota State Dental Association will hold its seventh annual meeting in Minneapolis on Wednesday, Thursday, and Friday, July 9, 10, and 11, 1890.

M. G. JENISON, *Corresponding Secretary*,
608½ Nicollet avenue, Minneapolis, Minn.

NEBRASKA STATE DENTAL SOCIETY.

THE annual meeting of the Nebraska State Dental Society will be held at Omaha, Neb., on the 20th day of May, 1890.

A cordial invitation to be present is extended to the members of the profession. I. W. FUNCK, *Secretary*, Beatrice, Neb.

MICHIGAN DENTAL ASSOCIATION.

THE thirty-fifth annual meeting of the Michigan Dental Association will be held at Jackson, Mich., June 3, 4, and 5, 1890.

WM. CLELAND, *Secretary*,
No. 152 Woodward avenue, Detroit, Mich.

NORTH CAROLINA STATE DENTAL ASSOCIATION.

THE sixteenth annual meeting of the North Carolina State Dental Association will be held in Wilmington, N. C., commencing on the fourth Tuesday in June and continuing its sessions for three days.

There will be a full programme of scientific work, including a large clinic. A cordial invitation is extended to the profession to attend.

H. C. HERRING, *Secretary*, Concord, N. C.

ARKANSAS STATE DENTAL SOCIETY.

THE third annual meeting of the Arkansas State Dental Society will be held in Little Rock, commencing on the third Tuesday in May, 1890.

L. G. ROBERTS, *Secretary*,
Eureka Springs, Ark.

COLORADO STATE DENTAL ASSOCIATION.

THE fourth annual meeting of the Colorado State Dental Association will be held in Denver, Col., June 3 to 5, 1890. A cordial invitation is extended to the profession to be present.

CHARLES F. DODGE, *Cor. Sec.*,
Leadville, Colorado.

UNIVERSITY OF PENNSYLVANIA—DENTAL ALUMNI.

THE tenth annual reunion of the Society of the Alumni of the Department of Dentistry, University of Pennsylvania, will take place at the Colonnade Hotel, corner of Fifteenth and Chestnut streets, Philadelphia, Pa., on Wednesday, April 30, 1890, commencing at 10 o'clock A.M.

DENTAL COLLEGE COMMENCEMENTS.

CHICAGO COLLEGE OF DENTAL SURGERY.

THE eighth annual commencement of the Chicago College of Dental Surgery (Dental Department of Lake Forest University) was held at the Chicago Opera-House, Chicago, Ill., on Tuesday, March 25, 1890, at 2.30 P.M.

The class valedictory was delivered by Will Lloyd Jones, D.D.S., and the faculty address by A. W. Harlan, M.D., D.D.S. An address was also delivered by W. C. Roberts, D.D., LL.D., president of the University.

The number of matriculates for the session was two hundred and forty-five.

The degree of D.D.S. was conferred on the following graduates by Truman W. Brophy, M.D., D.D.S., dean of the faculty :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Chas. E. Austin, B.S.	Vermont.	John J. Pountain	Illinois.
Frederick D. Axton	Illinois.	Harry M Prickett	Illinois.
James D. Baues	Illinois.	John W. Putnam	Illinois.
Daniel W. Bottorf	Illinois.	Frederick K. Ream	Illinois.
John H. Chase	Wisconsin.	Edmund W. Russell	Minnesota.
Joseph W. Dostal	Illinois.	Otto A. Ruthenberg	Illinois.
W. E. Emmons, L.D.S.	Winnipeg, Can.	Charles C. Ryan	Illinois.
Allan B. Fernald	Illinois.	Grant J. Roberts	Illinois.
Harvey E. Follansbee	Wisconsin.	F. E. Salisbury	Illinois.
O. Edward Gibson	Wisconsin.	Frank S. Schadel	Wisconsin.
L. M. Goodearle	Wisconsin.	James A. Shoemaker	Iowa.
Earl E. Gould	Illinois.	Albert G. Seeglitz	Illinois.
Frank A. Green	Illinois.	Jacob H. Smyser	Illinois.
Edwin G. Howard	California.	Melvin W. Swartz	Illinois.
Frank S. Heer	Illinois.	Frederick R. Suggitt	Illinois.
Will Lloyd Jones	Wisconsin.	Lewis S. Tenney	Illinois.
Richard Kempter	Wisconsin.	Frederick S. Tinslar	Illinois.
Halbert E. Kinney	Wisconsin.	C. M. Trompen	Michigan.
Frank Kolar	Illinois.	Rollin B. Tuller	Illinois.
Ernest L. Knapp	Illinois.	Orrin Thompson	Wisconsin.
Frank A. Lane	Illinois.	George W. Toles	Michigan.
James T. Lennington	Illinois.	James L. Ubellar	Illinois.
Michael Lenninger.	Illinois.	John Q. Waddell	Illinois.
Charles B. Magill	Iowa.	C. H. Waterhouse, M.D.	New York.
James R. Maguire	Illinois.	Charles E. White	Wisconsin.
George B. Martin	Ontario, Can.	Herbert C. West	Minnesota.
Almon G. Moffitt	Ohio.	William H. Wiesler	Wisconsin.
James D. Moore	Illinois.	Chas. A. Whitenack	Wisconsin.
Joseph G. Pfaff	Illinois.	Edward E. Williams	Iowa.
Guy M. Phelps, M.D.	Illinois.	George E. Zinn, B.S.	Illinois.

GERMAN-AMERICAN DENTAL COLLEGE.

THE commencement exercises of the Deutsch-Amerikanische Schule für Zahn-Heilkunde (German-American Dental College) were held at Kretschmer's Hall, Chicago, Ill., on Saturday, March 15, 1890.

The annual oration was delivered by Prof. F. Brunhoff, and the valedictory address by Dr. George Guttmann.

The number of matriculates for the session was ten.

Diplomas were awarded to the following graduates by Dr. George J. Schaller, president of the College :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Oscar Abert	Germany.	Philip Orth	Illinois.
Dr. George Guttmann	Germany.	Edmund Weber	Illinois.
Fraz von Guerard	Germany.		

AMERICAN COLLEGE OF DENTAL SURGERY.

THE annual commencement exercises of the American College of Dental Surgery were held at the Recital Hall, Auditorium, Chicago, Ill., March 26, 1890.

The class valedictory was delivered by John Sanford Batchelor, D.D.S., and the doctorate address by Gustavus North, A.M., D.D.S.

The number of matriculates for the session was one hundred and forty-nine.

The degree of D.D.S. was conferred on the following graduates by L. D. McIntosh, M.D., D.D.S., president of the board of directors :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Chas. H. Albrecht	Minnesota.	S. T. Holmes	Iowa.
S. W. Boetticher	Illinois.	H. L. Hedges	Washington.
S. Pomeroy Bevier	Wisconsin.	F. C. Hartt	Illinois.
J. S. Batchelor	Wisconsin.	Louis E. Ireland	Illinois.
J. J. Barber	Ohio.	Walter T. Kelly	Illinois.
Scott T. Currier	Illinois.	Philip S. Kirk	Wisconsin.
I. Clendenen, M.D	Illinois.	T. F. McKey	Illinois.
C. E. Drummond	Iowa.	T. A. Mayhew	Illinois.
J B. Dowling	Iowa.	F. S. Newton, M.D	Iowa.
Frank Ekowski	Poland.	F. J. Phipps	Wisconsin.
L L. Funk	Illinois.	W. H. Pontius	Illinois.
Algernon N. Ferris	Iowa.	Claude F. Ray	Wisconsin.
John L. Finklesten	Massachusetts.	C. Schroeder	Illinois.
Robert A. Gardner	Illinois.	Edward C. Tobler	Illinois.
F. Ernest Graef	Germany.	B. R. Wilson	Illinois.

UNIVERSITY OF TENNESSEE—DENTAL DEPARTMENT.

THE twelfth annual commencement exercises of the Dental Department of the University of Tennessee were held at the Masonic Theater, Nashville, Tenn., on Tuesday evening, February 25, 1890.

The charge to the graduates was delivered by Prof. John A. Witherspoon, M.D., and the dental valedictory by G. Letcher Brown, D.D.S.

The number of matriculates for the session was twenty-five.

The degree of D.D.S. was conferred on the following graduates by Charles W. Dabney, Jr., Ph.D., president of the University :

NAME.	STATE.	NAME.	STATE.
G. Letcher Brown	Kentucky.	W. D. Kallock, M.D	Tennessee.
Benjamin F. Burke	Kentucky.	W. J. Morrison	Tennessee.
Andrew Caldwell	Tennessee.	A. W. Myers, M.D	Kentucky.
Flora Dillon	Indiana.	James W. Ratliff	Mississippi.
Ernest P. Hickman	Alabama.		

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

THE closing exercises of the Royal College of Dental Surgeons of Ontario were held in Normal School Hall, Toronto, on the evening of the 28th of March, 1890.

The valedictory address was delivered by William Mills, L.D.S.; address to the graduating class by Dr. J. B. Willmott, dean of the faculty. A general address was given by Dr. W. George Beers, of Montreal.

The number of matriculated students in attendance during the session was seventy-one.

H. T. Wood, M.D.S., president of the board of directors, presented the diploma of the college, conferring the title of L.D.S., to the following persons, viz:

G. P. Allen.
J. A. Armstrong.
D. Allen Black.
Thomas Butler.
George F. Belden.
M. F. Binkley.
A. Stanley Burns.
Ira Bower.
Milton Cavanagh.
J. F. W. Chittenden.
Denton Dulmage.
C. M. French.
Benjamin Gollop.
W. R. Hamilton.
John H. Johnston.
Oliver Martin.
Archibald Milloy.
Sylvester Moyer.
William Mills.
W. D. MacLaren.
Walter F. McPhee.
M. G. McElhinney.
Alfred T. Pearson.
William Revell.
Wesley Richardson.
M. W. Sparrow.
James F. Simpson.
W. H. Steele.
W. J. Trotter.
A. W. Thornton.
F. W. Tweddle.
J. J. Wisser.

All of the Province of Ontario, Canada.

The diploma of Master of Dental Surgery was conferred upon J. P. Marshall, L.D.S.

EDITORIAL.

AN EVIL NEEDING CORRECTION.

We have had frequent occasion to note the unwarranted modifications made by the authors in the reports of remarks made at association meetings, when the stenographer's report, which we had reason to believe was substantially correct, has been transmitted to them for correction. When proof is sent to writers or speakers it is for the purpose of enabling them to correct any inaccuracies in the report, and to make such minor modifications of language as will more clearly express the thought intended to be conveyed. An extended elaboration to twice or three times the space occupied by a stenographic report, including remarks which had not been uttered, or such changes in sense as to make the remarks of the speakers who followed without meaning, is a not unusual occurrence. Instances are not rare in which, when a speaker has been criticised by subsequent speakers to his disadvantage, the portions of the remarks animadverted upon are eliminated, making it necessary that the strictures should also be eliminated. This is manifestly unfair, and imposes an unpleasant necessity upon an editor. Smart rejoinders are sometimes interpolated which did not occur to the speaker until after the adjournment of the meeting, and which, had they been spoken, would probably have been met by a keen retort ; but as no opportunity for reply was afforded, the gentleman thus interpolating his later wit is left apparently master of the field, upon which he had been actually vanquished.

It would seem that when a speaker has either purposely or inadvertently expressed an opinion, employed an argument, or made a statement which the criticisms of his confrères have caused him to regret, the legitimate course is, in the language of the ring, to "take his punishment like a man." Such course would save reporters and editors much unmerited criticism for careless reportorial work or unnecessary and injudicious editing.

DENTAL SECTION OF THE AMERICAN MEDICAL ASSOCIATION.

In the Dental Cosmos for April we published the programme of the Section of Dental and Oral Surgery for the forty-first annual session of the American Medical Association, which meets at Nashville May 20 to 23 inclusive. This meeting will no doubt be largely attended, and it is to be hoped that there will be at least a fair attendance of dentists. The programme includes papers by Drs. Williams, Lydston, Hunt, Marshall, Gish, McIntosh, Briggs, Marcy, Taft, Talbot, and Sherman. Whatever may be thought as to the association of a dental section with a national medical body, so long as such an arrangement exists there should be enough professional pride to insure a reputable representation and a creditable conduct of the Section.

THE QUESTION OF AN INTERNATIONAL DENTAL CONGRESS.

Responsive to a circular invitation of the New Jersey State Dental Society for a conference concerning an International Dental Congress, about sixty dentists, representing the States of New York, Massachusetts, New Jersey, Pennsylvania, and Maryland, met in the parlor of the Hoffman House, New York City, on April 8, 1890. Dr. S. C. G. Watkins was elected president, and Dr. Charles A. Meeker secretary. After considerable discussion regarding the holding of an International Dental Congress in 1893, Dr. W. W. Walker, of New York, offered the following resolution, which was passed unanimously :

> *Resolved*, That the matter of holding an International Dental Congress in 1893 be hereby referred to the American Dental Association at its next meeting at Excelsior Springs in August next.

BIBLIOGRAPHICAL.

PLASTICS AND PLASTIC FILLING: as pertaining to the Filling of all Cavities of Decay in Teeth below Medium in Structure, and to Difficult and Inaccessible Cavities in Teeth of all Grades of Structure. By J. FOSTER FLAGG, D.D.S., Professor of Dental Pathology and Therapeutics in the Philadelphia Dental College. With illustrations. Third edition, revised. Octavo, pp. 215. Philadelphia, 1890. Price, cloth, $4.00.

This work, substantially as now presented, has been before the dental profession during a period of ten years. At intervals, in some societies and journals, comments and criticisms of the subjects as described and advocated by Dr. Flagg have been somewhat freely made, but it would seem that the several very positive positions taken by the author have been neither demonstrably refuted nor generally adopted in practice.

The fact that plastics are largely and apparently increasingly employed in dental operations may be taken as corroborative of some of the views held by the author and the New Departure Corps, as it was at first termed. By this time the novelty of the departure should have been somewhat worn away, and the verifiable results be deemed to have sustained or discredited the practical positions taken. The author has in this third edition nowhere receded from these, but in his conclusion reaffirms the New Departure Creed with added emphasis. He says, significantly and truly, "Few know how to use good plastics to good advantage, and very, very few as yet know how to use them in the best known way. This is demonstrated at every society meeting where the work is tried. Scores are willing and anxious to show their skill with foil, but few are they who dare to show their skill with plastics."

This last sentence is worthy of the attention of the conductors of clinics at all society meetings, because as a rule, in every vocation, the most difficult things to do well are those which are so apparently simple that nearly every operator thinks he knows all about them.

The volume deals in details of manipulation which cannot but prove helpful to a large majority of practitioners who, however they may differ with the author in his estimate of the character and conduct of materials in general use, will nevertheless be stimulated to the exercise of more exact methods in the processes of practical plastics.

The changes and additions of this third edition are noteworthy, but lack of space will not admit of specific reference to them. The fact of a third edition, and the importance of the subject so fully discussed in this the only considerable work extant devoted exclusively to these topics, render the volume indispensable to the completion of the library of the dentist who is alive to the necessity of standard literature in the practice of a progressive profession.

PRACTICAL ELECTRICITY IN MEDICINE AND SURGERY. By G. A. LIEBIG, Jr., Ph.D., Assistant in Electricity, Johns Hopkins University, etc., and GEORGE H. ROHÉ, M.D., Professor of Obstetrics and Hygiene, College of Physicians and Surgeons, Baltimore, etc. Profusely illustrated. Octavo, pp. 378 and index. Philadelphia and London: F. A. Davis, publisher, 1890. Price, cloth, $2.00.

This volume of nearly four hundred pages is more especially addressed to the physician and surgeon than to the dentist, particularly in Parts II and III. The former treats of electro-physiology, electro-diagnosis, and a description of many forms of apparatus and instruments used for the modification and application of electricity in disease; Part III is devoted to the therapeutic effects and methods of application, and its special value as a remedial agent.

Part I, however, may claim our attention in a general and scientific way, as it is a concise and intelligible presentation of the fundamental laws involved in the use of electricity, whether applied as a remedy, as a heat-producer, or as a motor-power. It is not absolutely necessary to be acquainted with these laws and principles to successfully use electricity in the dental profession, but a knowledge of them will enable the operator to use the agent with an intelligence and confidence which he could not otherwise have, and thus add much to the pleasure of this special branch of his vocation. Whether he uses the current generated by the ordinary galvanic battery or that supplied by the electric companies now available at so many places, the principles equally apply. Especial attention may be called to that part of the first chapter in which an explanation, as free from technicalities as possible, is given of the important laws of Ohm and Kirchhoff, by which only many of the problems of electricity can be made clear and intelligible. A careful study of this chapter will make one quite familiar with the value and application of the generally confusing terms of resistance, current strength, electro-motive force, etc. In the second chapter the study of magnetism leads easily and instructively to the consideration of the various forms of the galvanometer both for measuring the current strength and the differences of potential as indicated by the amperemeter and voltmeter; also to the method of reading galvanometric deflections, and the uses and value of the shunt. Magnetic induction is naturally followed by the study of the induction coil, and its rationale of action is concisely but clearly demonstrated.

Chapter III takes up the subject of the various forms of batteries, and the fourth and concluding chapter of this part of the work is devoted to the storage battery.

The electro-physiology of Part II will be interesting and instructive to those in our profession who may desire to use galvanism in any of its applications about the mouth ; here it is important to study the physiological effects of galvanism, both in the direct application to the tissues and the induced effects from the diffusion of a current to the optic, auditory, gustatory, olfactory, and other contiguous nerves, and the spinal cord and brain, especially to become familiar with the effects on the latter organ, as nausea, headache, vertigo, vomiting, and other undesirable conditions are readily produced by improper methods and points of application.

The book is well printed and appropriately illustrated.—M. J. G.

A NEW MEDICAL DICTIONARY : including all the Words and Phrases used in Medicine, with their Proper Pronunciation and Definitions. Based on recent Medical Literature. By GEORGE M. GOULD, B. A., M.D., Ophthalmic Surgeon to the Philadelphia Hospital and Clinical Chief Ophthalmological Department, German Hospital, Philadelphia. With Elaborate Tables of the Bacilli, etc. Small octavo, pp. 520. Philadelphia : P. Blakiston, Son & Co., 1890. Price, half-dark leather, $3.25 ; with thumb index, half morocco, marbled edges, $4.25.

We cannot better serve author and publisher in the same space than by copying the following statements concerning the aim and scope of this volume from its preface, merely adding that a somewhat careful examination of the book leads to the conclusion that the author has kept the object thus set forth steadily in view, the effort resulting in a dictionary which fairly measures up to the expressed purpose :

1. To include those *New Words and Phrases* created during the past ten years—a period rich in coinages—which appeared destined to continuous usage. There are certainly thousands of these, and in their compilation I have especially endeavored to cover the latest results in the study of Bacteriology, Ptomaïnes, Leucomaïnes, Electrotherapeutics, Embryology, Physiology, Pathology, etc., and in the various special branches of medicine such as Ophthalmology, Otology, Laryngology, Gynæcology, etc.

2. To frame all *definitions* by the direct aid of *New, Standard, and Authoritative Text-books*, instead of making a patchwork of mechanical copying from older vocabularies.

3. While neglecting nothing of positive value, to *omit obsolete words* and those not pertinent to medicine except in a remote or factitious sense.

4. To make a volume that will answer the needs of the medical student and busy practitioner, not only by its *compactness of arrangement* and *conciseness of definitions*, but also by its *convenience of size* and *price*.

TRANSACTIONS OF NEW YORK ODONTOLOGICAL SOCIETY, 1889. Philadelphia: The S. S. White Dental Manufacturing Co., 1890.

This is the annual issue in book form of this important society's Transactions, the proceedings for the last year making a volume of two hundred and ten pages. There were several important papers read during the year by Drs. Davenport, Meriam, Bogue, B. Holly Smith, and others, and much able discussion, which the friends of the society have here in neat shape for preservation.

PAMPHLETS RECEIVED.

The Action of Hyoscine Hydrobromate, Nitro-glycerine, Hydrocyanic Acid, etc., on the Circulation of the Blood. By Arthur C. Hugenschmidt, of Paris, France. Presented on March 15, 1887, before the Faculty of the Medical Department of the University of Pennsylvania for the degree of Doctor of Medicine.

Retrospect and Prospect. Address delivered before the American Academy of Dental Science, at their twenty-second annual meeting, held in Boston, November 13, 1889. By John T. Codman, D.M.D., of Boston. Published by the Academy. Boston: Fort Hill Embossing and Printing Co., 1890.

The Cause of Death from Chloroform. By H. C. Wood, M.D., Professor of Materia Medica and Therapeutics in the University of Pennsylvania, and H. A. Hare, M.D., Demonstrator of Therapeutics. Reprint from the *Medical News*, February 22, 1890.

Hygiene and Health. Popular Manual for the Treatment of the Oral Cavity and the Teeth, their Scientific Importance, etc. With Table of First and Second Dentitions. By Professor Guiseppe Cali, Naples, 1889. [Translated.]

Fifth Annual Report of the Board of Dental Examiners of the State of Minnesota to the Governor of Minnesota, December 15, 1889. Minneapolis: Alfred Roper, 1889.

Proceedings of the Mississippi State Dental Association. Fifteenth Annual Session, Vicksburg, May 21–23, 1889. Jackson, Miss.: Clarion-Ledger Publishing House, 1889.

Third Annual Report of the Massachusetts Board of Registration in Dentistry. For the year 1889. Boston: Wright & Potter, 1890.

Verhandlungen der Deutschen Odontologischen Gesellschaft. Band I, Heft 2. Verlag von August Hirschwald, Berlin, 1889.

Neurósis Reflejas en Relación con Patolojía Dental, tomada del "American System of Dentistry," por el Doctor Zegers, dentista. Santiago de Chile: Imprenta Cervantes, 1889.

OBITUARY.

DR. H. H. WINN.

DIED, at Hong Kong, China, February 8, 1890, of tuberculosis, HENRY HOLMES WINN, D.D.S., aged forty-nine years.

Dr. Winn was born at Walthourville, Ga., June 2, 1840. He began the study of dentistry in the year 1860 with Dr. Matter, of Henry, Ill., and graduated from the Ohio College of Dental Surgery in 1865. He first practiced in Canton, Ill., where he remained until September of the same year (1865), when he went to Yokohama, Japan. After conducting here successfully a practice for some years, and later in Hong Kong, China, he removed to Shanghai in 1873, which place he has since made his home. At the time of his death he was associated in partnership with Dr. R. H. Kimball, having offices in Shanghai, Hong Kong, and Yokohama, and was the senior and probably best-known dentist in that part of the world.

In his profession, which he greatly loved, he was a painstaking, conscientious laborer, and the high esteem with which American dentistry is regarded in the Far East is due in a very large degree to his skill and thoroughness in every department of his chosen work.

His wife and five children survive him.

DR. ALBERT WESTLAKE.

DIED, at Pittsfield, Ill., March 10, 1890, Dr. ALBERT WESTLAKE, of Elizabeth, N. J., in the eighty-fourth year of his age.

Dr. Westlake was born near Newburgh, N. Y., October 6, 1806, his father being a son of one of the first settlers of Orange county. He received his early education in the country schools and at home. In 1824 he began the study of medicine in Philadelphia, and when twenty-one years of age began to practice dentistry. He belonged to the itinerancy for some time, practicing in Elizabeth, Paterson, Morristown, and other places in New Jersey, subsequently opening an office in Park Place, New York. He was intimately associated with Mr. Jones, of the then constituted firm of Jones, White & McCurdy, and was active in forwarding the interests of the profession.

When thirty-nine years of age, Dr. Westlake was married to Miss Cornelia Howland Carter, of the old Virginia family, and removed to Rahway, N. J., and subsequently to Elizabeth. He was a Christian gentleman, and was beloved and respected by all who knew him. He leaves a widow, three daughters, and three sons. Two sons are practicing dentistry in Elizabeth, and one in Illinois.

DR. B. F. VAN BOSKIRK.

DIED, at Selinsgrove, Pa., March 21, 1890, of apoplexy, Dr. B. F. VAN BOSKIRK, in the fifty-eighth year of his age.

Dr. Van Boskirk was born at Mifflinsburg, Pa., August 2, 1832. He had been a practitioner of dentistry for thirty-five years, up to the time of his decease, and commanded an extensive and lucrative clientage. He was well informed and skillful in his profession, was of a cheerful disposition, and was regarded in the community in which he lived as a generous and an upright man.

In 1852 Dr. Van Boskirk married Miss Louisa Hall. They had four children, who with his wife survive him. His funeral was largely attended from his own and the communities of adjacent towns. Having been a member of the Masonic fraternity, his funeral was conducted in accordance with the rites of that order.

DR. JOHN AUSTIN.

DIED, at Ogdensburg, N. Y., April 10, 1890, of heart-disease, Dr. JOHN AUSTIN, in the seventy-second year of his age.

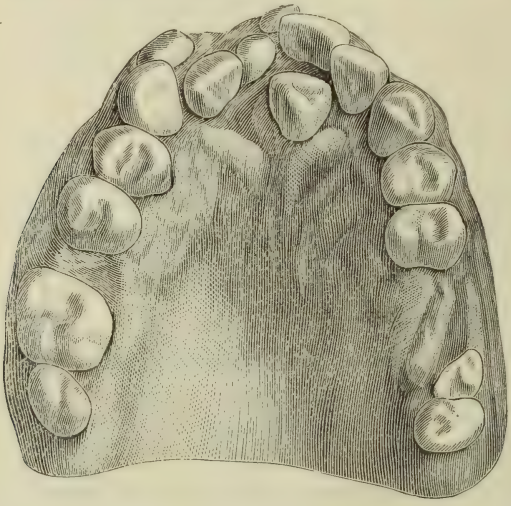
Dr. Austin was born in Gouverneur, N. Y., September 13, 1818. He was educated at Potsdam, and afterward taught school in Depuyster. He studied dentistry with Dr. D. C. Ambler, of Ogdensburg, and began practice in 1844. In the prosecution of his profession he traveled throughout Northern New York and a considerable portion of Ontario. His active practice extended over a period of about thirty-five years.

Dr. Austin took an interest in public matters, having held several offices in Ogdensburg, among them that of alderman for several years. He was regarded as a man of energy and integrity. In 1845 he married Miss Ruby M. Blaisdell, of Depuyster, who died several years since. He leaves one son, Dr. John B. Austin, and four daughters.

HINTS AND QUERIES.

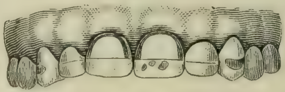
DELAYED DENTITION.—Mr. E. H., of East Poultney, Vt., is now, at the age of thirty-eight years, erupting a superior right central incisor of normal size and character, excepting a somewhat worn appearance of the cutting-edge. The illustration shows that it occupies a position behind the right lateral. This tooth has a cone-shaped crown, and came into place outside the arch when the subject was twenty-five years of age. The left central, which has a pinched appearance but is in proper position, came at the age of twenty-three, and the left lateral at twenty-six. The eruption of the cuspids was between the years of sixteen and eighteen. Concerning the bicuspids and molars there are no definite data. The third molars are so extremely small that their eruption would be very unlikely to attract attention. In the twentieth year a small supernumerary came into sight in the place nearly of the then missing right central, and about the twenty-sixth year a large cuspid-like supernumerary appeared considerably behind the left central.

Aside from these data, I have no information as to whether other members of the family, or the parents or grandparents, have exhibited abnormalities of dentition. Mr. H. is himself of large size and in vigorous health, without any hereditary taint of which I am aware. The lower teeth are of the usual type in number and form. The case is certainly a remarkable one with reference to the lateness of eruption, the malposition of the laggard teeth, the presence of dwarfed third molars, and the advent of tardy supernumeraries.—H. A. Dalrymple, D.D.S., Rutland, Vt.



Four Incisors Inlaid.—The patient, aged eighteen years, a young woman of otherwise prepossessing appearance, was disfigured by defective superior incisors and cuspids, due probably to severe infantile meningitis, of which she had had two attacks. The palatine aspects of the teeth were normal, but the labial surfaces of the incisors were pitted and discolored in a very unsightly manner.

Having an experience in porcelain inlay work dating from 1868, I decided upon that method of restoration as, under all the circumstances, advisable in this case. Shallow cavities were cut in the four incisors, and from porcelain teeth of like shapes, sizes, and shades corresponding thin inlays were cut, and with oxyphosphate of zinc cemented into the cavities. Subsequently the approximal and cervical joinings were excavated and filled with gold, as were also the two narrow grooves in the cuspids and three small pits in the left central. To have included these pits in the inlay would have seriously weakened the cutting-edge of that incisor. The appearance of the completed operation is fairly indicated by the illustration, made from a photograph. With

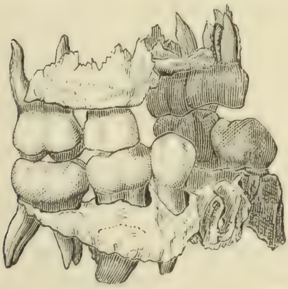


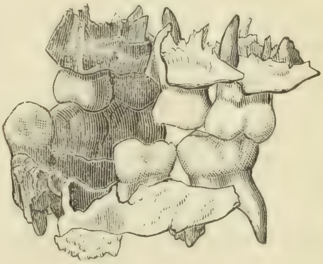
regard to the probable permanence of the operation I may add that I have recently seen to be alive and in good condition a superior central incisor in the labial face of which, twenty years ago, I set a very large inlay with oxychloride of zinc and filled around the border with gold.—S. Davis, D.D.S., Denver, Col.

Necrosis of the Alveolar Process.—Case of a girl aged five years. Had scarlet fever four months previous to presentment for examination, when it was found that there was necrosis of the entire alveolar process of the lower jaw, and also of the upper jaw posterior to the cuspids. There was furthermore observable an anchylosis of the lower jaw.

Nourishment was taken through a glass tube inserted in the opening caused by the loss of the lower incisors. The odor from the mouth was exceedingly offensive.

The sequestra of the lower jaw were first removed, and with them the calcified crown germ of the inferior right first bicuspid. Five days later the sequestra of the upper jaw were removed. The illustrations clearly indicate the extent of the deprivation, the teeth having been retained in the processes, with the exception of the lower incisors and left cuspid, which had been previously lost. A few days subsequently the germ crown of the inferior left first bicuspid likewise came away.





The treatment consisted of a wash composed of carbolic acid and glycerine.

Every other day an effort was made to overcome the anchylosis by manipulation in the following manner: The patient was seated on the floor, her head held between the knees of the operator, who, with his thumbs in her mouth and his fingers clasped on the outside, endeavored to move the jaw slightly up and down several times. At first very little, if any, movement was obtained, but at the end of the three months the jaw had been rendered capable of nearly normal movements.

At about this period the parents of the child removed from the city, and no definite report of the case was received until twelve years later, when a relative stated that the girl had enjoyed good health, and that her permanent teeth were well developed.

Teeth Lost by Rubber Ligatures.—The patient was a child of thirteen years. Several months before coming under my observation the superior right and left first bicuspids had been extracted to make room for the cuspids, which were prominently outside the arch. Rubber-band ligatures were stretched over each bicuspid and cuspid to draw them together. The patient's report was that during the past two months she had suffered greatly from the pain and soreness of both bicuspids. These teeth were found to be very loose and much elongated. The alveolar process around them was entirely absorbed. The father of the child had been informed by the dentist who applied the ligatures that the condition of the mouth was due to hereditary syphilis. The retention of the bicuspids was so slight that they were easily removed, and a rubber band was found at the apex of each tooth.

The preceding brief reports of two very interesting cases are taken from a lecture in the Baltimore College of Dental Surgery, February 8, 1889, by Dr. Kasson C. Gibson, of New York City.

SECURING IMMEDIATE SUCTION IN DENTURES.—Some years ago, somewhere in dental literature, I came across a suggestion for securing immediate suction in a new dental plate, or a newly-repaired one. It has been of so much use to me that I herewith submit it, and advise its trial. The plate is moistened, and then simply sprinkled with fine powder of gum tragacanth. The plate is then pressed in place, and no matter how good or bad a fit, it will hold firmly for a day under almost any use or abuse. The advantage of this will be apparent to anyone ; for the first half-hour or few minutes after a plate is put in for the first time makes or mars the reputation of the dentist, for the time being, in the estimation of the inexperienced patient, whose efforts to "suck up" a plate, if not immediately successful, are at once discontinued, the plate is taken out, and the invariable remark is, "It don't fit."

A patient will bring a rickety, ill-fitting plate, and after being without it the few hours necessary to repair it will insist that the plate fitted perfectly before it was confidingly submitted to our care, but now it feels as though it had been made for another party. A thin coating of tragacanth will even up all irregularities, soothe the wounded sensibilities of the patient, and prevent the plate's wounding the sensitive membrane of the mouth.

Tragacanth is a white gum like arabic, but has special advantages for this use, as it swells when wet by the fluids of the mouth, becomes sticky and of the consistency of jelly, but does not dissolve or wash out for hours. It should be kept in a salt- or flour-shaker with fine perforations in the top, and should be sprinkled on the surface of the plate, shaking off all the free powder after a moment. Having no odor and little taste, it is in no way objectionable. It might be put up in suitable, perforated boxes and flavored with wintergreen, or otherwise made more elegant, mysterious, and costly. If the dentist is of the opinion that time and use will improve the general adaptation of the plate, a small box of tragacanth should be presented to the patient with directions for use when there is a varying atmospheric pressure which may possibly affect the suction of the plate ! Its use will also obviate the necessity for labored explanations as to the cause of certain plates only resting on certain prominences of the maxillary and certain other tender places on the mucous membrane. It will also be a relief to the patient, for the mental effort necessary to the intellectual digestion of these scientific dissertations, and to retain a credulous expression of countenance, is often evidently as painful as the sharp edges of the plate.—L. C. BRYAN, Basle, Switzerland.

A PROTECTOR FOR THE UPPER TEETH WHILE EXTRACTING LOWER TEETH.—The profession is well aware of the danger of breaking or of chipping the upper teeth by a blow from the forceps while extracting a lower tooth, especially one that is more or less exostosed. Careful operators usually apply a napkin against the upper teeth just over the tooth to be extracted, and those who have used this method have found great difficulty in keeping the napkin in place, as the hand that holds the napkin is in use under the maxilla, and therefore cannot with safety be depended upon for the double service. To overcome the difficulty take an impression of a medium-sized natural upper denture; take a cast of it, wax the cast over the teeth to about the thickness of an eighth of an inch on the cutting-edges and running back as far as the second bicuspids, allowing the wax to reach only to the margins of the gums, and made much thinner than on the cutting-edges. Then invest as in any case to be vulcanized, and pack with soft or velum rubber, preferably the black. After vulcanization trim with sharp scissors, boil and wash, and allow to remain in the air for two or three days. I suggest the making of three sizes. Being made of soft rubber insures a fit, as the elasticity of the rubber allows it to be adapted to any mouth and holds it there securely. Vulcanized soft rubber after a time becomes hardened and brittle to a certain extent, as is seen in artificial palates. When in this condition, place it in boiling water, adding a little borax, and allowing it to boil from five to ten minutes. This will restore the elasticity to the rubber, and it will then be in as good condition as when first vulcanized.

I think a trial will convince anyone of its usefulness and fully repay him for any trouble he may have had in making the device.—W. G. Foster, D.D.S., Baltimore.

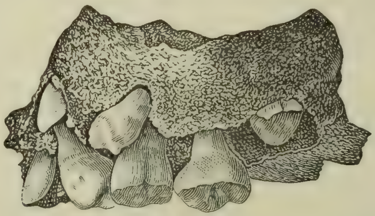
Combined Zinc Phosphate and Alloy.—The article on this subject by Dr. Driscoll in the March Cosmos brings to my mind the fact of a similar suggestion some years ago, in one of our dental journals, by Dr. H. B. Tileston, of Louisville, Ky. In accordance with his method I have been accustomed to first mix the alloy, but am careful to have no excess of mercury to be expressed. I then mix the oxyphosphate very thin, and with a stiff spatula incorporate the amalgam very thoroughly until the mass can be rolled between the thumb and fingers, when it is quickly packed into the cavity and burnished to the margin as usual. When the cavity includes the masticating surface, this can be made of simple amalgam, which, if added before the compound becomes hard, will solidly adhere. The filling is especially adapted to cavities so difficult of access, or so sensitive, that thorough excavation is impracticable. Amalgam in such cases is not suitable, and cement alone is not durable, but the two combined make a filling which seems to be lasting. I have used these materials so combined for nearly two years, and so far the results are satisfactory. Dr. Tileston says that he now fills with the combination such approximal cavities as he formerly filled with amalgam.—L. W. Skidmore, D.D.S., Moline, Ill.

Dental Obtundents.—Much has been recently said upon the subject of new obtundents as aids to painless operations upon the teeth, but in practice I find these obtundents to in themselves produce as much or more pain than is caused by the use of instruments sharp and rapidly manipulated.

There need be seldom any difficulty with nervous patients in excavating cavities of decay. Strangers will often object to the use of the dental engine, chiefly because of the noise and jar conveyed through the cable; their fears are soon allayed by its judicious use for a moment, but if one then objects it is set aside and hand instruments used. Experience soon convinces the patient that burs are preferable to excavators; in fact, it is usually admitted that the engine occasions less, if any, pain.

The secret lies in the fact that after the rubber-dam has been adjusted, the cavity carbolized and thoroughly dried, a small sharp bur is first used, and then larger ones until the requisite size is reached. They are rapidly rotated, but not held in any one position long enough to heat the tooth, and in this method is found the simplest and best pain-obtundent now extant. Pain will almost invariably arise from use of large, blunt, or dull excavators or burs.—W. E. Boardman, D.M.D.

Dental Irregularities of the Native Races.—In the *Southern California Practitioner*, Dr. E. L. Townsend, of Los Angeles, discusses the question as to whether there are any influences connected with civilization that are productive of degeneracy of the dental system. He takes issue with the generally-accepted statement that the uncivilized and semi-civilized races are largely exempt from dental malformations, irregularities, and caries, and thinks that the percentage of such conditions among savages is quite equal to those found in the civilized races. He claims to have had fairly good opportunities for examining the reservation Sioux Indians in Minnesota and Dakota, the Klamath Indians of Oregon, and the Pueblos of New Mexico, and found decayed teeth and irregularities common among them. Dr. F. M. Palmer, of Los Angeles, has made quite extensive explorations of the Rancherees on the islands of the California coast, and has resurrected upward of three thousand burials. He secured one interesting specimen, which is represented in the cut,—the left superior maxilla of a child about ten years of age. The last temporary molar has maintained its position, crowded the second bicuspid outside of the arch, and rotated it so that it strikes the first bicuspid obliquely. The lateral incisor is crowded inside the arch, and the cuspid would have erupted into a very prominent position. As the last of the Indians were removed from the island (Catalina) more than eighty years ago, the baneful influences of civilization could not have acted on the owner of the jaw illustrated below.



Dr. Townsend says truly, "It is a pity that archeologists should have spent so much time in collecting things constructed by savage races, and allowed the construction of the savage himself to pass unnoticed."

I think the illustration will prove interesting to the dental student.—E. H. L.

Beeswax Root-Filling.—Dr. B. F. Arrington, whose suggestion of beeswax as the best material for root-filling was published in the March number of the Dental Cosmos, explains that he does not warm lead or tin caps,—only the gutta-percha caps; and adds that the addition of a fiber of cotton is essential to perfection of success.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

STUDIES ON THE ANATOMY AND PATHOLOGY OF THE TUSKS OF THE ELEPHANT.

BY W. D. MILLER, M.D., D.D.S., BERLIN.

(Continued from page 348.)

MINUTE ANATOMY OF THE TUSKS OF ELEPHANTS.

A. *Cement.*

THE cement forms but a very small portion of the whole tusk. Among hundreds of tusks I have not met with one case in which its thickness near the base of the tooth exceeded six millimeters. Toward the point it is wanting, having been worn away by the rough usage to which the tusk of the elephant is subject. The presence of a layer of cement three to five millimeters thick, on a piece of ivory, may be considered as an indication that it was taken from a part of the tusk not far from the alveolar border.

Microscopically, the cement of the elephant's tusk is similar to that of the human tooth. It possesses a distinctly lamellated structure, and is, as far as I have been taught by an examination of twelve different specimens, under perfectly normal conditions, without blood-vessels.

The cement-lacunæ are exceedingly numerous, and are often arranged in rows parallel with the laminæ (Fig. 10). They possess a large number of minute, finely-branched processes (Fig. 11).

The residual or penetrating fibers of Sharpey are remarkable for their number, length, and regularity. In many cases, also, these fibers, or cement canaliculi, as they may be more properly termed, present regular secondary curvatures, giving the cement an appearance very much like that of ivory (Fig. 12).

B. *Dentine, or Ivory.*

Ivory, as also tubular dentine in general, consists of an organic basis-substance, permeated with lime-salts and penetrated by fine, branching sheathed tubules, which pass from the center of the tooth or from the pulp-chamber to the periphery. It is organically connected with the cement through the medium of the stratum granulosum.

FIG. 10.

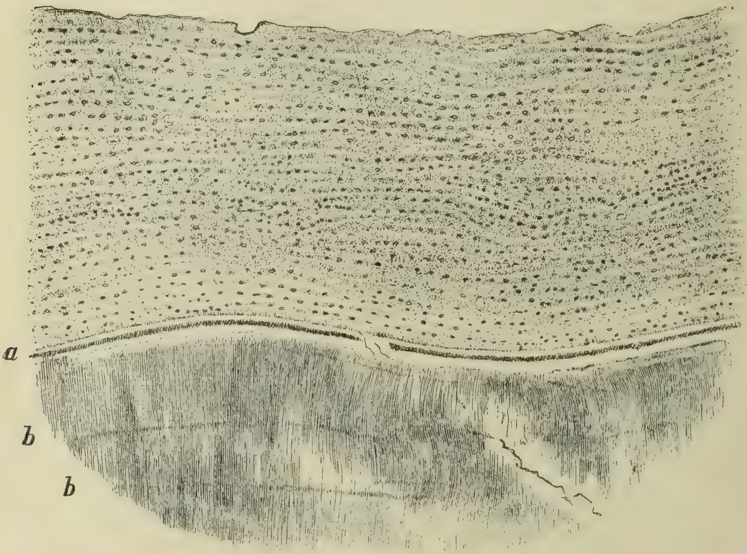

FIG. 10.—Cross-section of cement, showing the arrangement of the lacunæ in parallel rows. *a*, stratum granulosum; *b*, strata interlamellaria of the dentine. 56 : 1.

FIG. 11.

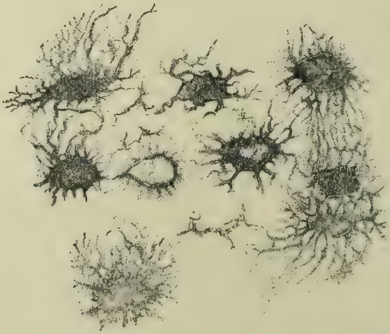

FIG. 11.—Lacunæ of the cement, showing their very minute branching canaliculi. 1000 : 1.

The tubules are narrower and more numerous than those of human dentine, and to this structural peculiarity the greater density and elasticity of ivory has been supposed to be due; a view which, in part at least, does not seem to conform to the facts, since we have seen that the density of ivory is less than that of human dentine. It is also quite possible that the pronounced secondary curvatures of the tubuli may have more to do with the elasticity of the tissue than their closeness.

The general direction of the tubules is perpendicular to the walls of the pulp-chamber, and therefore slightly inclined toward the apex of the tooth. They possess primary, secondary, and tertiary curvatures.

FIG. 12.

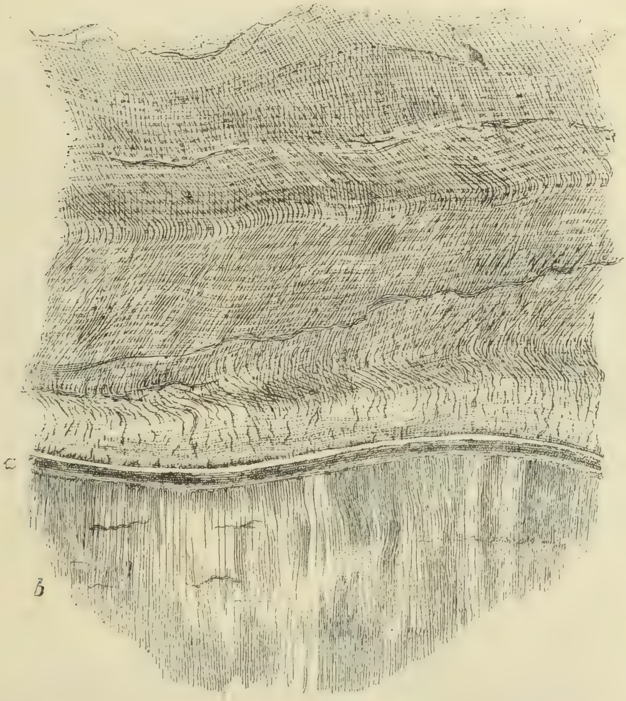

FIG. 12.—Cross-section of cement, showing the marked gyrations of Sharpey's fibers. *a*, stratum granulosum; *b*, dentine. 250 : 1.

The primary curves are two in number: a short, distinct curve, convex toward the apex of the tooth, and a long, slightly marked curve, concave toward the apex (Fig. 13). In three of the six specimens which I examined the latter curve was entirely wanting, being replaced by a straight line.

The secondary curves vary greatly in different tusks and in different portions of the same tusk, sometimes being short and abrupt, sometimes long and shallow or wavy. On the whole, the so-called secondary curvatures of the tubules of human dentine are in no way to be compared to those of the tubules of ivory.

On cross-sections the tubules are seen to pass from the center of the tooth, radially, in an almost straight line toward the periphery ; not until about one-third of the distance has been passed do the gyrations appear, and then continue to near the periphery. In the outer zone of dentine, varying from one to two millimeters in thickness, the curves are likewise wanting. The secondary curvatures give the ivory, in thin sections under the microscope, the appearance of a succession of waves of varying length and height, the distance from crest to crest measuring from one to three millimeters.

FIG. 13.

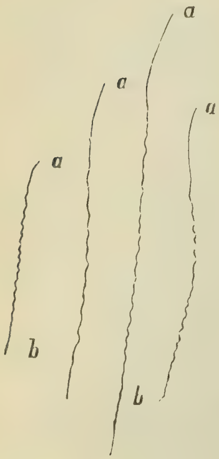

FIG. 13.—Tubuli from four different tusks, showing primary and secondary curves. *a*, central; *b*, peripheral extremity. Natural length.

They appear in longitudinal as well as in cross-sections, from which the inference would seem to be justified that the tubules are spirals, a supposition which is supported by an examination of thin sections by polarized light, although an examination of separate sections under the microscope does not reveal a spiral character.

On examining a cross-section under low power we observe a series of alternating light and dark bands (Fig. 14) corresponding to the curves seen by the naked eye on a cross-section of ivory (see Figs. 6–8). In the light bands the tubules appear to be much less numerous than in the dark ones. I am inclined to believe, however, that this is not the case, but that the light bands represent the lines in which the section cuts the tubules at some angle, whereas the dark bands represent those

FIG. 14.

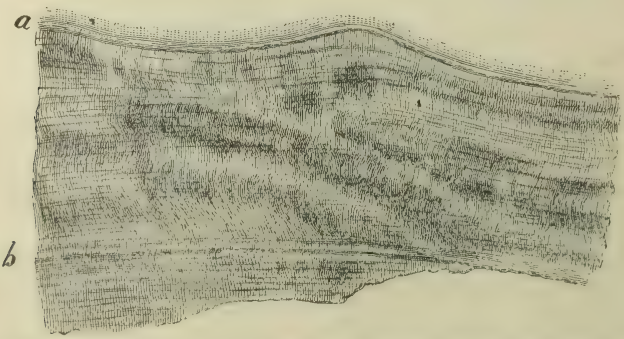

FIG. 14.—Cross-section of ivory at the border of the cement, showing the wavy structure and the alternating light and dark bands produced by it. *a*, stratum granulosum ; *b*, strata interlamellaria. 250 : 1.

portions in which the section lies parallel with the tubules. This view is also supported by the fact that the light bands show the same figures by polarized light as do sections cut at right angles to the general direction of the tubules.

The occurrence of the second series of bands, cutting those seen in Fig. 14 at varying angles, and thus producing diamond-shaped, lozenge-shaped, square, and six-sided figures (see Figs. 6–8), may, I think, be understood by an examination of Figs. 15 and 16. In the former we have a very slightly exaggerated picture of what may be called the ground pattern of ivory on cross-sections.

We see here straight rows of whitish, opaque, six-sided figures, converging from the periphery toward the center of the tusk, so arranged that the figures in one row correspond to the spaces in the next row. Owing to the convergence of the rows, the diagonals must appear as curves (portions of the spirals seen in Figs. 6–8), made up of a succession of opaque spots, which, unless closely examined, produce the appearance of continuous bands, and, as there are two sets of diagonals, there must necessarily be two sets of bands or spirals crossing each other. The dark bands are produced by the more transparent but deeper-colored tissue between the light bands. These figures, though sometimes perfect hexagons, are usually more or less modified in form by the obliteration of one or more angles, thus giving rise to the great variety of appearances observed in different specimens of ivory.

FIG. 15.

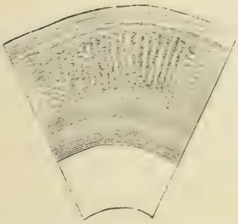

FIG. 15.—Sector of a cross-section, nat. size. The structural details are reproduced only in a portion of the drawing.

FIG. 16.

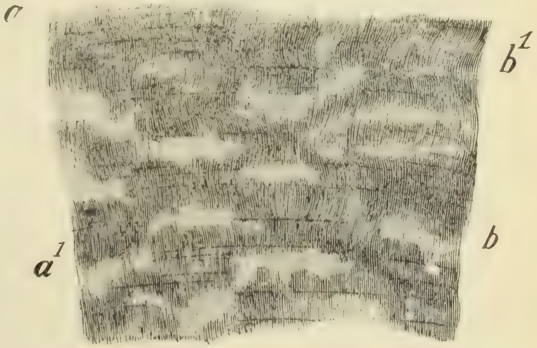

FIG. 16.—Cross-section of ivory, showing the mode of formation of decussating bands or spirals. *a*, *b*, and *a′*, *b′*, short sections of such spirals. 250 : 1.

In Fig. 16 I have given a pattern very similar to that seen in Fig. 15, under a magnifying power of two hundred and fifty diameters. Here the opaque figures are elongated and their sides so blended together that their hexagonal nature is in most cases not apparent. The two sets of bands, *a b*, and *a′ b′*, are, however, distinctly visible.

The second series of bands or spirals may be entirely wanting, as in the case illustrated in Fig. 14. This is due to the blending together of the opaque spots in one set of diagonals, by which the opposite set is naturally destroyed.

The object of this arrangement, it may be assumed, is to give greater strength and solidity to the ivory, inasmuch as a fracture of the tooth following the direction of the tubuli would present a much greater breakage surface than if the tubuli were straight. My attention was first called to this fact by the study of a large tusk, which had been broken straight across; the breakage surface exhibited two series of curved, parallel troughs and ridges, cutting each other at various angles, so that the whole surface was made up of thousands of minute pyramids about one millimeter in height. I was able to produce a similar effect by breaking sections of ivory in different directions, thereby obtaining the results illustrated and explained in Fig. 17.

FIG. 17.

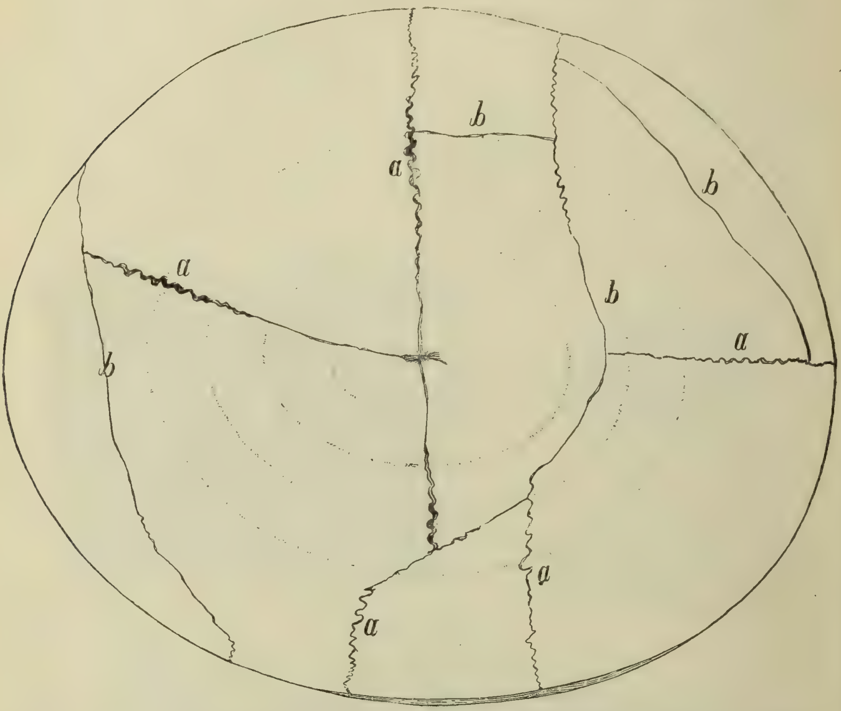

FIG. 17.—Cross-section of a tusk, showing lines of fracture. Fractures parallel (or nearly so) with the direction of the dentinal tubules (*a*) are in the outer two-thirds distinctly notched; fractures perpendicular to these (*b*) are smooth.

The tertiary curvatures appear on the crest of the secondary, and are very short and abrupt ; they are not a constant appearance in ivory. As to their cause and object I am unable to furnish any explanation. Aside from these curvatures, which are of *macro*scopical dimensions, the tubules isolated by the action of strong mineral acids appear, under a power of two hundred and fifty diameters, as delicate spirals, possessing great similarity to Spirochæte plicatilis (Fig. 18).

Attention has been called above to the presence of concentric rings, plainly visible to the naked eye on most specimens, and to the suggestion that these rings may serve to indicate the age of the animal from which the tooth is taken. Under the microscope a large number of such rings of various widths may be seen. I have counted as many as two hundred and fifty on the cross-section of a young tusk.

FIG. 18.

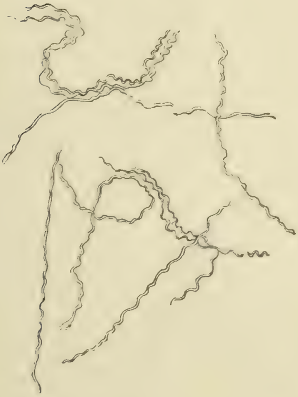

FIG. 18.—Tubules from ivory isolated by strong mineral acids.

FIG. 19.

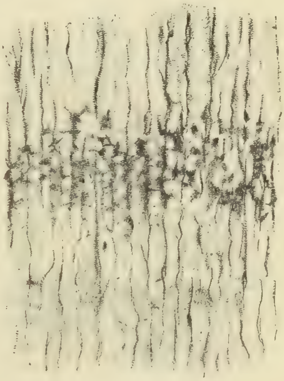

FIG. 19.—Cross-section of ivory near the cement border, showing a stratum interlamellare. Circa 300 : 1.

They are, as is revealed by higher powers of the microscope, nothing more or less than narrow zones, having a character very similar to but not identical with that of the stratum granulosum (Fig. 19). They owe their existence, I conceive, to interruptions in the regular process of dentinification of the pulp, and give support to the view that the deposition of dentine by the pulp is not continuous, but takes place in periods, which, from the specimens above referred to, I take to be fractions of a year. I have designated them by the term strata interlamellaria.

Ivory which has been subjected to various changes of temperature and moisture for a series of years or centuries separates into a number of conical tubes or layers (Fig. 20), which may sometimes be drawn out of each other like a nest of glass beakers. The walls are often but the fraction of a millimeter in thickness ; one in my possession has repeatedly been pronounced to be a piece of parchment.

The separation is supposed to take place along the line of the strata interlamellaria, though I am not aware that the belief rests upon positive proof.

C. *Enamel.*

The enamel forms a layer about 0.75 millimeter thick, between the cement and dentine, at the tip of the young tooth. It is usually observed, however, as a thin, white, shining layer after the cement has been worn away; or we find only irregular islands of enamel scattered here and there over the surface of the dentine, the rest having been worn off, or having sprung off in consequence of the extreme heat and dryness to which the tusks are subject during transportation. Sometimes pieces of enamel may be picked off with the finger-nail, at other times it adheres very firmly to the dentine.

FIG. 20.

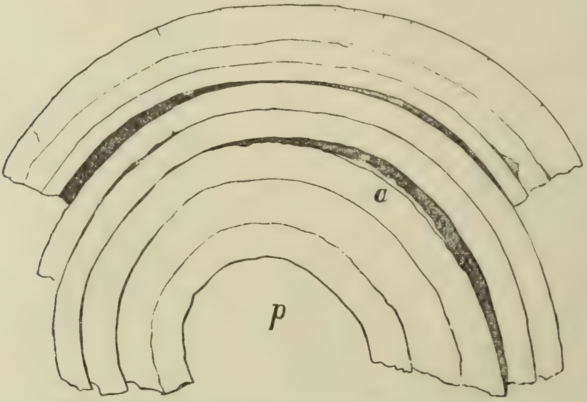

FIG. 20.—Ivory from tusk of mammoth, breaking up into concentric layers.

Microscopic preparations of the enamel suitable to the closer study of its minute structure are somewhat difficult to procure, on account of its extreme brittleness. I have but one good specimen, which I obtained by gluing a thick section through the cement, enamel, and dentine upon an object-glass, and then, after the glue had hardened, working it down to the necessary thinness with disks of emery-paper.

According to this one preparation, the enamel of the elephant's tusk may be said to be identical with that of the human tooth. It has no organic connection either with the dentine or the cement, and the surface bordering on the ivory lacks the indentations present on the inner surface of human enamel.

It is highly double refractive, distinctly laminated in the outer portions; in the inner, in the specimen under consideration, so transparent as to show few details of structure.

The prisms are almost straight, and show very delicate striations, which may be followed in form of bands across a number of prisms at a time, thereby, as far as I can judge from this specimen at least, disposing of the idea that they must be due to "delicate offshoots of the enamel-fibrils." This same character of the striations may, by the way, be also observed in specimens of human enamel.

(To be continued.)

THE MANUAL-TRAINING IDEA AS A FACTOR IN DENTAL EDUCATION.*

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA.

(Read before the First District Dental Society of the State of New York, March 11, 1890.)

To speak of the necessity for improvement in any department of life is simply to admit that we progress; that our social evolution from a comparatively simple condition to one more complex, implies and carries with it demands for greater energy in that eternal struggle for the harmonious adaptation of means to ends.

The increasing activity manifested in the tendency toward improvement of all our vital relations has become a characteristic of the age; one by one our beliefs, institutions, and methods run the gauntlet of criticism, and are compelled to answer, in one way or another, the questions of their truthfulness, value, or utility.

In general educational matters, reform is actively at work. Methods whose antiquity had caused them to be regarded as almost sacred have, in many cases, been supplanted by those which the demands of the present have found to be better adapted to its needs.

Our dental educational institutions have not escaped this inquisition. The dental profession, and indirectly the public, are asking if the professional equipment of the graduate is the best that can be had. Has he been so educated and trained that he is the fittest to carry on the work of saving human teeth?

The recent elaborate papers of Drs. G. S. Dean and L. C. Ingersoll, published in the DENTAL COSMOS, have not only drawn attention to the need for improvement in the matter of dental education, but have suggested at least two distinct lines upon which improvement may

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*The name *manual training* is inadequate to convey all that is now included by the exponents of the manual-training method. While great modifications and improvements have been made in the method itself, the name remains as at first given, and has become so closely identified with it that it seems now to be fixed beyond all reasonable expectation of alteration. By the present conception of the manual-training principle, any method which involves a direct appeal to any of the perceptive faculties is properly included under the title, therefore the *manual-training idea* was chosen as descriptive of the theme under consideration.

be made. The former lays stress upon the judicious selection of what he aptly terms the "dental timber,"—*i.e.*, men whose preliminary education and training shall have rendered them particularly suitable subjects for special development in dental knowledge and skill. The latter suggests certain reforms in the educational methods pursued in dental schools, among others the abandonment, or at least abridgment, of the lecture system, and the substitution of the catechetic method of instruction, the teaching of fewer methods, the abolition of the custom of having a large corps of clinical instructors, on the ground that the mind of the average student is confused by witnessing a diversity of methods, and so learns none thoroughly.

It is not within the scope of the title selected for this paper to discuss the merits of the question at issue between the gentlemen cited, as they have already done this exhaustively, but to call attention to the practical importance of the manual-training idea as now understood, with some suggestions as to its possible value as an educational method for the dental student.

As a means for the acquisition of knowledge, the manual-training method is as old as man himself—probably older. The formulation of the idea, and its development into what its more enthusiastic champions believe it to be,—viz, a complete system for educational development,—is of very recent occurrence. The idea has been used in more or less fragmentary form ever since institutions of learning have existed, but its development into a method based upon a complete understanding of its physiological and psychological relations was only arrived at within quite recent years.

It is related that when the proprietor of that unique institution of learning, "Dotheboys Hall," initiated his assistant, Nicholas Nickleby, into the methods pursued there for the education of his pupils, he did it as follows: Having called up the class in English spelling and philosophy, Old Squeers said, "Now, then, where's the first boy?" "Please, sir, he's cleaning the back parlor window," said the temporary head of the class. "So he is, to be sure," rejoined Squeers. "We go on the regular education system here: C-l e-a-n, clean, verb active, to make bright, to scour; W-i-n, win, d-e-r, der, winder, a casement. When the boy knows this out of book, he goes and does it. Where's the second boy?" "Please, sir, he's weeding the garden," replied a small voice. "To be sure," said Squeers, by no means disconcerted, "so he is. B-o-t, bot, t-i-n, tin, n-e-y, ney, bottinney, noun substantive, a knowledge of plants. When he has learned that bottinney means a knowledge of plants, he goes and knows 'em. That's our system, Nickleby."

While it cannot be said that "Old Squeers" had grasped the manual-training idea in its entirety, it is but fair to admit, without regard to his motives, that he had an understanding of at least one important phase of it.

The manual-training idea, according to Prof. Henderson,* may be viewed from two stand-points, based upon the nature of its application as an educational method :

First, that in which the object or thing created by the hand is the end sought, in which event manipulative skill alone would be the highest educational result obtained ; or,

Second, where the method is directed toward the cultivation of the brain and development of the intellect, in which case the psychological or ethical result is the primary consideration.

Admitting, for the moment, that both these apparently diverse results are attainable by the method under consideration, then it follows, necessarily, that a successful application of this principle to the education of dental students should involve a recognition of the dual nature of the method, and a harmonious balance of its essential characteristics be maintained in its application.

It has been shown that the brain may be cultivated and the mental faculties developed by manual training alone in individuals whose intellect is practically a zero quantity. The investigations of Dr. Edward Seguin, of New York, to whose labors for the training and education of idiots, and to whose discoveries in that field, the manual-training system of to-day probably owes the discovery of its physiological foundation, proved to the point of demonstration that the intelligent education of the hand was productive of results equal in importance and value to those obtained through any of the perceptive faculties, and in the case of idiots it afforded the only practicable channel for developing intelligence. The results which he obtained by the manual-training method, in the case of idiots, were, at that time, little short of miraculous. The plan which he pursued may be briefly stated as follows : The child, who in many of the cases was absolutely devoid of intelligence, or whose intelligence was of such a low order that it could not be appealed to by any psychical process, was made to perform some simple act with the hand, such, for example, as to pick up a peg from the table and place it in a hole made in a block of wood. Notwithstanding the simplicity of the procedure, it was frequently beyond the mental capacity of the subject to understand what was required of him, even when repeatedly shown how to do it. It then became necessary for the teacher to place the peg in the child's hand, close his fingers upon it, and carry the peg to place. Frequent repetitions of the act at last resulted in causing the child, upon command, and by his own volition, to perform the act without aid, or, in other words, the incessant bombarding of the brain by impulses originated at the periphery had resulted in a gleam of intelligence in the brain, which, for the first time, asserted its newly-awakened function in a command sent out to the periphery to perform a definite volitional act.

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* "The Spirit of Manual Training." Prof. C. H. Henderson. *Popular Science Monthly*, 1889, p. 433.

This much accomplished, the future educational training of the child consisted in a continual application of the same principle, with suitable variations in method, proceeding from simple to more complex acts, with the result in many cases of developing a high grade of intelligence and mental responsiveness where absolutely none had previously existed.

The investigations of Dr. Seguin led him to the generalizations of the mutual dependence of the great nervous centers and the periphery, with the greater possibility of acting on the centers through the periphery than on the periphery through the centers, at least during the period of growth, and that the initiative of a certain order of capacities resides in the periphery and sensibility, and he says,* "Therefore, instead of referring all initiums to the brain, or brain, spinal cord, and sympathetic, we must recognize the power of the millions of peripheric brains to give impulse as well as to receive it." In summing up, he makes this significant statement: "If the good results shown in the case of idiots subjected to manual training have been obtained by this method alone, then the sovereignty of the brain is at an end, and the new physiological doctrine of decentralization contains in germ a new doctrine and new methods of education."

The phase of manual training as applied to the education of idiots has been dwelt upon at some length, because a study of it demonstrates the physiological basis upon which it rests, and exhibits it in its greatest simplicity divested of all cognate aids. It is, in fact, the manual-training method reduced to its lowest terms.

The photographs (see illustrations) which I hand around for your inspection are reproduced from a brochure by Dr. Seguin entitled "The Psycho-Physiological Training of an Idiotic Hand," reprinted from the *Archives of Medicine* for October, 1879, and represent first a child at six months of age, healthy; then at eighteen months, after convulsions; next at five and a half years, with idiocy fully developed; and lastly, after one year of manual training. The photographs are so characteristic and in the portrayal of mentality so self-explanatory as to need no further comment.

When such astonishing results in mental development are possible by manual training alone, where a normal intelligence is wanting, what may not be expected when this principle is applied where its effect is aided by the reasoning faculty? It was the recognition of its value by Froebel which suggested to his mind the Kindergarten system for the education of children, a system in which the deficiencies are in the method, or of its application, rather than in the principle upon which it depends.

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* "New Facts and Remarks concerning Idiocy." E. Seguin, M.D. A lecture delivered before the New York Medical Journal Association, October, 1869.

In the mind of the idiot educated by manual training, the sum total of his knowledge is represented by a multitude of impressions developed through the perceptive faculties; his power to reason about these may or may not become highly developed, depending upon his curability.

In the case of the normal infant, however, his reasoning faculty develops, *pari passu*, with his acquisition of facts. As his store of mental photographic impressions increases, his generalizations become broader, his knowledge of the various bearings or phases of a given fact or event becomes, in time, so varied, that it may be likened to a composite photograph in which the lines of coincidence only are preserved, while the points of difference are lost. In the comparison of these mental composites he has advanced the next higher step in reasoning power, has given up the arithmetic of knowledge for the algebra of reason, thrown aside the concrete for the abstract, advancing in this way to the last abstraction of all.

The value of manual training for the development of manipulative skill in the dental student is admitted by all, and needs no argument. The value of the manual-training idea as an educational method in the mental cultivation of the dental student probably needs greater emphasis.

Dr. Felix Adler has said* "hand-culture, apart from its value *per se*, is a means toward a more effective brain-culture." The dentist who has spent a short time in the practice of his profession, and gained even no more than average manual dexterity, who cannot accept the truthfulness of this statement must admit that his experience has taught him nothing. It has become a trite saying that "experience is the best teacher," and in dental teaching, within certain limits, this is put into practice. Thus all the reasoning or didactic teaching in the world will not enable a student to successfully fill a tooth or make an artificial denture until he has seen it done; or it may be said, even at the risk of making an Irish "bull," that he cannot properly do either until he has first done them imperfectly; and though it may be urged that the practical part of dentistry is already taught in the clinic room and laboratory, yet, if viewed in the light of their possibilities as educational means, from the stand-point of the manual-training principle, at the same time bearing in mind, as before stated, that any method of imparting knowledge which involves the exercise of any of the perceptive faculties is properly included in the manual-training idea, it is questionable if these departments have received the attention and elaboration which their real value as educational factors demands. It has been shown that development of the intellect is a natural physiological process presenting two distinct phases,—viz, the acquisition of basis facts through the perceptive faculties, and the

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***Century* Magazine, October, 1888.

orderly arrangement of and reasoning upon the acquired knowledge. The function of the laboratory, therefore, naturally precedes that of the lecture-room; and for the reason that by far the greatest proportion of the labor of the dental educator is devoted to imparting to the student a knowledge of the facts of dentistry, it seems clear that the laboratory and clinic room should be the arenas for his most conscientious and devoted efforts as instructor.

To achieve results commensurate with its possibilities, dental instruction, both in the laboratory and clinic room, should be placed in the charge of teachers not only imbued with an appreciation of the educational value of the work of those departments, but they should be men who have teaching ability. To be able to impart instruction the teacher must not only know his subject, but know how to convey his knowledge to the pupil, which involves, among other things, a sufficiently clear psychological instinct to enable him to impress the student's brain through the channel of his greatest perceptive acuteness in any given case. Those in charge of these departments should be adequately remunerated, so that their whole time and attention could be made available, and their positions made equal in importance and dignity to the professorial chairs.

The laboratory course should include instruction in the making of dental instruments, in so far as it involves a knowledge of the physical properties of instrument steel, and the ability to convert it to use as a dental instrument. To this end the student should be required to make a limited number of typical forms, accurately to pattern, from steel of a known chemical composition; he should know its physical properties of hardness, elasticity, and tensile strength, study its fracture-surface in relation to these properties, the effect upon it of forging, bending, filing, hardening, tempering, and polishing. This, not for the reason that he expects to manufacture his own instruments, but for the training of his hands to do accurate work, and to develop, through his perceptive faculties, his powers of observation, sense of accuracy, judgment, and precision.

His metallurgical studies should include a study of the physical properties of the various metals used in dental prosthesis, their fusibility, hardness, toughness, malleability, elasticity, etc. He should make their dental alloys, including those used for solders and amalgams, and be impressed with the necessity for the use of the balance and their proper treatment in the furnace for attaining accuracy and uniformity in their composition. His chemical training should be at least sufficient to enable him to intelligently undertake their analysis and purification.

The laboratory instruction should also include a study of the properties of filling-materials, both physical and chemical, their adaptability, hardness, toughness, solubility, edge strength, expansibility, and the modification of these by various manipulative methods, etc. He should perform operations upon teeth out of the mouth, and prove the quality of his results by examination with the lens, sharp point, and aniline test. This knowledge of the properties of materials should precede his instruction in their special application in the mouth.

The line of laboratory instruction is merely indicated, and should be held as tentative only until a sufficient examination of its educational possibilities has been made. Investigation in this line may develop the fact that an adaptation of a portion at least of the methods which are now in successful use in the regular manual-training schools may prove to be the more direct course toward expert manual skill in the line of special dental technique. This would of course be unnecessary if the dental ranks were recruited from the graduates of manual-training schools; but it can hardly be doubted that, if the manual-training idea in relation to dental technique alone was faithfully carried out, it could not fail to be productive of several important results,—that which naturally follows first being manipulative ability of a high order, the unprejudiced record of which would be the work done. In far too many instances, dentists who have taken the ordinary college course have acquired that manual dexterity necessary for the successful pursuit of their calling at the expense of their patients during their first years of practice, in addition to untold nervous wear and tear upon themselves, a method fraught with mortification at the thought of the probable failure of their operations, and danger to their ultimate reputations. But the discipline of the laboratory course of manual training which has resulted in increased muscular accuracy, and perfection of judgment as to form, size, or quality of material, should, when intelligently applied, have developed the reasoning quality in relation to the mass of facts imparted, enabling their possessor to form an intelligent opinion as to their proper application. His store of mental composite photographs is now sufficiently large, so that he is equipped for generalizations; he should be able to initiate and project new ideas in the line of his work, which is the foundation of that condition of mental flexibility or adaptability so essential to the successful practice of his calling. The necessity for accuracy in dental operations, which his laboratory discipline should have imparted, cannot have failed to make him the most uncompromising critic of his own work, and to develop that love for truth and integrity which is the foundation of a higher and broader professional manhood, and whose ethical end is righteousness.

Freely admitting that the judicious selection of the "dental timber" would, of itself, beyond all question, greatly improve the quality of the finished product, yet, in view of the lack of preliminary examinations of an efficiently selective character in our dental schools, the immediate question at issue is, "How shall the best results be gotten from the material as presented? Does not the manual-training idea offer the most promise as a means for developing a student of average abilities, just as it may be expected to produce the highest result when applied to the best?"

The question of how to make dentists is simply a problem of special education and training, and one which must involve a recognition and adaptation of the broad fundamental principles upon which all education rests. The belief that the manual-training idea, or physiological method, is one which promises the very highest results, is widespread. Philadelphia, notwithstanding her reputation for conservatism, has recognized the immense value of hand-training as a means for brain-culture to the extent of introducing it into her public-school system and maintaining at least one institution for its exclusive application, with the prospect of adding others in the near future. The success of the manual-training experiment in Philadelphia has excited the interest of teachers in all the institutions of the city, and in more than one it has revolutionized the system of instruction pursued. It may be urged that the time at command is inadequate for any extensive elaboration of the dental laboratory course, but when the importance of the question is realized it would seem advisable to secure additional time for it, even at the expense of an abridgment of the didactic phase of the instruction. The projected extension of the college course to three years will, however, afford increased time, and make it possible for the student to devote the first year at least to the kind of training under consideration,—the first year, because, in the language of that enthusiastic exponent of the natural method in education before quoted, "*the physiological education of the senses is the royal road to the education of the intellect; experience, not memory, the mother of ideas.*"

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PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, March 11, 1890, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. A. L. Northrop, in the chair.

Dr. V. H. Jackson, chairman of the Clinic Committee, read the following

CLINIC REPORT.

A stated clinic of the society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and

Ninth street. . . . Dr. A. W. Buckland, of Woonsocket, R. I., demonstrated his method of working hard cylinders and mats of non-cohesive gold. The cylinders are made of Nichols No. 4 gold foil, corrugated. For the larger cavities a full sheet is doubled on itself until the width is about that wanted for the length of the cylinder when completed. This is then cut in pieces about one-half inch or more in length, and rolled with the foil-pliers very firm. The cylinders are then set on end in the cavity, and are long enough to project above the surface. The cylinders are then wedged apart, and others are forced into place and finally burnished and cut down. This left the filling inserted to-day with a fine finish, and looking like cohesive gold. The doctor claims it will not pit. . . . . He also showed an electric mallet with the portion of the plugger that comes in contact with the thumb filed or turned smooth and round, and the part removed, restored with French rubber tubing, which clings to the thumb and gives more perfect control of the instrument. . . . He also showed a partial rubber plate, with five plain teeth, that measured one and three-eighths of an inch from before backward and one and seven-eighths of an inch laterally, that was swallowed by G. S., November 3, 1884, and retained until February 22, 1885, being one hundred and eleven days. The alimentary secretions had not affected perceptibly the surface of the plate. . . . Dr. Buckland also showed how he paints the inner surface of flasks for vulcanite work with a solution of whiting, which allows the plaster to be removed easily and protects the flask from corrosion. . . . Dr. S. C. Spooner, of New York, presented a patient with an upper and lower removable bridge, which were retained with clasps. They were made of thin 22-carat gold, and thickened by joining several layers with 20-carat solder. Gum teeth were used and attached with vulcanite rubber. In the lower one there was attached a solid gold central to fill the place of one lost from pyorrhea alveolaris, which assists in holding in place the adjoining ones. There were several crown gold fillings also shown in the same mouth. . . . Dr. J. Albert Kimball, of New York, showed a patient with malocclusion of the teeth caused by early extraction on one side of the mouth. The lower jaw was carried far to one side of the median line. Several suggested to open the bite either with a plate or bridge, and others to cap the teeth, etc. . . . Dr. Horace Dean, of Jersey City, demonstrated his method of taking partial impressions. He first takes an impression in wax and makes a plaster model on which he places a thin layer of wax, and fits to this wire gauze, such as is used for window-screens, letting the wire come only to the necks of the teeth, and not cover the crown. Plaster of Paris is then covered over this and the crowns of the teeth of sufficient thickness, which is removed and used as an impression-cup, using but a small amount of thin plaster. The doctor uses laundry-blue to color the plaster to assist in marking the place of separation, and glycerine as a separating fluid, with a small portion of soapstone sprinkled over it. . . . Dr. G. L. Curtis, of Philadelphia, examined a patient suffering with necrosis and pyorrhea alveolaris. The necrosis extended around three of the lower teeth and about one-fourth inch below the apex of the roots. He recommended to make an incision in line with the necrosed part and remove it, and treat with acidulated bichloride of mercury.

FIG. 1.

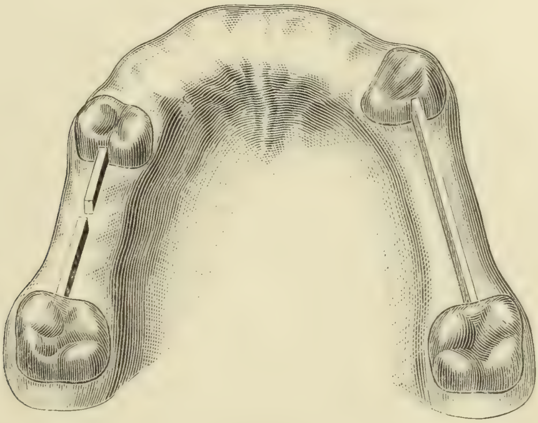
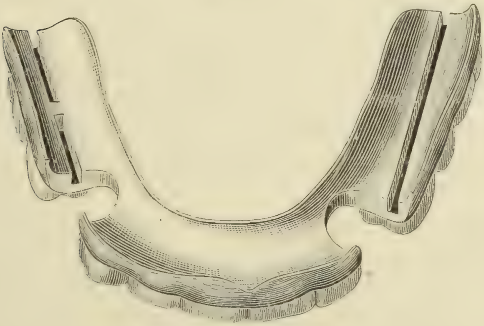


FIG. 2.



. . . Dr. H. A. Parr, of New York, illustrated his improved method of attaching artificial dentures, whereby one or more teeth may be securely held in position in the mouth and conveniently introduced or removed. It can be locked in place with comfort to the wearer, even though a number of stumps or natural teeth remain in the mouth. In diverging or converging teeth it is particularly applicable. Fig. 1 represents the superior part of the mouth with a number of teeth remaining in the jaw, and the locking device applied. Fig. 2 is a perspective view of the denture adapted to be fitted to the locking device. The natural teeth or roots are first fitted with a gold cap, then a flat bar, rectangular in cross-section, made of platinum and iridium, is soldered to the sides of the caps, reaching either from tooth to tooth or only a part of the distance, and made to be in contact at one longitudinal edge with the gum. Fig. 1 shows the bars attached to the crowns. In Fig. 2 may be seen channels to correspond with the number and positions of the lock-bars. These channels are of a width and depth only to receive the bars, and the plate is held in position by contact with the walls of the channels. The work can be done in rubber or celluloid, and when there are only a few stumps or teeth left.

Dr. G. L. Curtis. Mr. President, in reference to the acidulated bichloride of mercury, the use of which was advised in the treatment of a case as reported by your clinic committee, I have not had much experience except in experimenting with it. Prof. Laplace, of Philadelphia, discovered that bichloride of mercury when placed in living tissue coagulates the albumen, and that its action upon germs did not destroy them, but they continued to live in the solution. It therefore occurred to him to add something to the solution of bichloride of mercury that would prevent coagulation of the albumen; and he found that acidulating it would have this effect. The acidulated bichloride of mercury has been used by him, and presented to the medical profession, and has been generally adopted in France. Recently it has been ordered to be used in all the hospitals of France as a germicide, in preference to any other. We find in pathological laboratories that it is the only thing that will destroy germs of all classes, even that of anthrax. In my experiments I took the white of an egg and diluted it with water and added bichloride of mercury, and seeing that it produced coagulation, I took a portion of it and placed it in a proper medium, and found that the germs would grow, showing that they were not destroyed. A solution of acidulated bichloride of mercury was placed in a tube, and there was a clearing up immediately; it destroyed the possibility of coagulation, and the germs in the solution were destroyed in fifteen seconds. It was left in the solution, then parts of it taken out and attempts made to produce cultures, according to the system of growing germs, with no favorable result; which proved conclusively that the acidulated solution was a germicide, while the non-acidulated solution was not. Tartaric acid is, I believe, used by Prof. Laplace, although he claims that any acid will answer, either nitric or hydrochloric acid. His experiments have shown that the strength of the acidulated solution compared with the non-acidulated is as five to one; that is, where we use one to a thousand of the non-acidulated solution, we would get the same result from the use of one to five thousand of the acidulated solution. I would say that those who use it should be very careful or they will produce salivation. They should begin with a weaker solution,—one to ten thousand, perhaps.

The President. We will omit further incidents of office practice, inasmuch as we have so many in attendance. The paper that we have before us to-night is "The Manual-Training Idea as a Factor in Dental Education," by Dr. E. C. Kirk, of Philadelphia, whom I now have the pleasure of introducing to you.

Dr. E. C. Kirk. Mr. President and Gentlemen: It was once said, in his early career, of a gentleman now occupying high position as an educator, that he was a lamentable example of the kind of man whom circumstances had forced into the position of teacher before he had ever successfully filled that of the student. I wish to forestall any criticism of a similar nature that may possibly arise to-night, by stating that the matter which I shall have the honor of presenting to you is the result simply of some observations which I have made in witnessing the difficulties of others, and of some personal experience in overcoming the difficulties encountered during the period of studentship.

[Dr. Kirk then read his paper, which will be found on page 429 of the current number, and at its conclusion said,—]

Before the discussion of the paper is entered upon, I would like to say that I have asked two gentlemen of Philadelphia, who have had long experience in this matter of manual training, to be present with us to-night and express themselves upon the subject, or give us a demonstration of the fundamental methods pursued by them as teachers, and it seems to me that it would be well to hear their statements before the discussion is taken up.

Discussion.

The President. We have with us Prof. J. L. Tadd and Prof. Francis N. Thorpe, of Philadelphia, also Dr. Rickoff, of New York, who have had experience as teachers of manual training, and we will call upon them to pronounce themselves in regard to this matter. We will first call upon Prof. J. L. Tadd, of Philadelphia.

Prof. J. Liberty Tadd. Mr. President and Gentlemen: I am not here to theorize about manual training. Manual training is a desirable thing. I am past the stage where people question that. I have no time to waste on people who cannot feel in their very bones the benefit of skillful doing and intelligent thinking, and the dual working and well-being of the two.

There are different ways of getting at it, though. I find that many of the ways now in use waste a great deal of time without producing skill after all; and I shall show you by illustration a few of the methods that we have arrived at through much wasted time, and a few demonstrations of the method that I have used in teaching, as the most practical way of getting at manual dexterity. I feel a little bashful in the presence of so many gentlemen belonging to a profession which requires them to have and who have a great deal of manual dexterity in certain directions; but I have always felt a sympathy with dentists, who are required to have trained and skilled hands, because I know they have not always the full benefit of the use of the left hand, simply from lack of training. Their training heretofore has been bad. My business is that of an artist, and I shall give you a few personal experiences gained in learning it. I have tried some of the best schools for culture of the hand in Europe and in this country, and I found there was something lacking; and I am going to explain that deficiency by showing you a few of the methods which I use in my own schools. I shall begin by giving you a demonstration of what we do.

FIG. 1.

In my schools we have four things going on in rotation. I advocate drawing. There are different kinds of drawing. I am going to protest against some of the methods in use in many schools. In drawing I will give you one or two illustrations. [Draws a circle on blackboard, Fig. 1.]

I make a circle on the board. I shall purposely try to get away from the art idea: it is the manual-training idea that I want to get at. I shall use the babyish examples that I give to Kindergarten children; not artistic forms. I make a circle. This is the first exercise. The first thing in making a circle is the motion, to be able to swing the hand. You know that when you went to school, in the beginning, you rested your hand in drawing, you made the lines by bits. In many of the drawing-books that is still the method,—making the drawing in pieces, a little bit at a time, and resting the hand. This is a detriment. In making a circle, then, the hand must swing around without support, to get the motion, making a clear-drawn, circular line. This must be done with both hands, in both directions, with equal freedom. When any simple form can be put down at a stroke that way, we have acquired a certain amount of manual training of a most desirable kind. When complete forms can be made with ease, the hands are very skilled. My pupils make all elementary forms in this manner. So much for the drawing, or first process. I call this delineation on a flat surface.

The second exercise is making the same things or forms in soft clay. That is another process. The third process is making the same things in the opposite of soft clay, *i.e.*, tough wood. We use oak in our schools, similar to the examples here shown, simply because it is tough, not liable to chip, and very even in grain.

Practicing these different processes in their order gives the hand skill that, in my belief, surpasses the skill to be acquired by any other method now in use.

There are two hundred and forty different trades, and there is not a trade that does not have one of these four processes as a fundamental element.

The fourth process I should mention is designing,—*creating* forms on flat surfaces in soft clay and in tough oak. Those are the four processes that we have.

A great many practical people think that carpenter-work is good manual training, and they take up a trade. All the trades are good ; I am not opposing any trade ; I am only coming, through experience, to the fundamentals underlying all trades. I do not want anyone to waste his time with plumbing, or carpenter-work, or mechanical drafting, or architectural work, or chipping and filing. Those are good things, and I advocate them in special schools ; but I am now advocating a system of manual training that will give the greatest manual dexterity in the shortest space of time, and I claim that the method I have just described is one of the best to get absolute manipulative skill. [Samples of work in different materials shown. Drawing on blackboard, Fig. 2.]

FIG. 2.

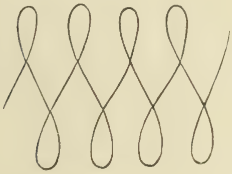
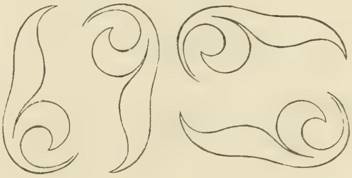


FIG. 3.



There is no artist in the world, living or dead, that could or can make that form perfectly, yet any child may attempt to do it ; and to be able to make the loops stand up straight and equidistant is discipline of the hand. If you do it with both hands, all the better. To be able to make those forms equidistant is a direct method of getting proportion, balance, and a great many other things desired. The making of these forms exercises and trains the eye and the hand. [Drawing, Fig. 3.] This is a common form that you see in art continually, in ornaments. My pupils studying hand-training are required to make this figure on the board, and they practice making it with equal facility in each direction. In doing that they acquire a certain amount of skill in graduation, flow of lines, and distribution of magnitudes, that is not possible in following the old-fashioned method of drawing, which is to build a skeleton of dotted lines first, and on that erect those forms as taught in the old school-books. The method here pursued is to make simple forms and memorize them sufficiently to be able to put them in any direction. That is hand skill. We have a graded series of forms. I will give you some of the more complicated ones. [Drawing, Figs. 3, 4, 5, 6, 7.] This is a Moorish design. To be able to swing the hand in any direction means a certain amount of manual dexterity that the ordinary training does not give. One of our schools contains eleven hundred pupils, all of whom work in this way. They must be able to draw that form with equal facility in any direction. And not only that, but an endless variety of forms. We carry out that idea in making clay shapes. This form [model] was made by one of my pupils to-day.

FIG. 4.

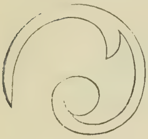


FIG. 5.

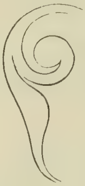
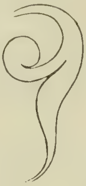


FIG. 6.



This is to illustrate the fact that a shape of this sort can be made with the hands, both working at the same time. The children work with both hands,—one on the one side and one on the other, using both at the same time. The same is true in working in wood. They must be able to take the tools in either hand and work in every conceivable direction. It is not skill of one hand only, but of both. One thing that I insist upon is that no instruments shall be used in drawing. I am very much opposed to the use of compasses, calipers, measurers, or any kind of accessory instruments as helps. I want them to get back of the use of the tools and become skilled in themselves. I notice that most artisans to-day must have their instruments ; if you take away their rulers, gauges, and other similar helps, they cannot do anything. And it is so in a great many of the trades. I teach my pupils to make all the forms balance, mentally, and with their naked hands. We want the forms to be balanced, to a degree, so that one side of the thing can be made as readily as the

FIG. 7.

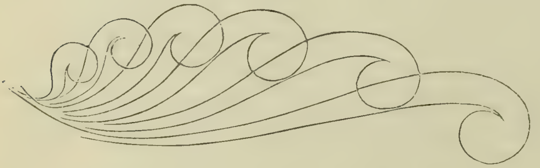
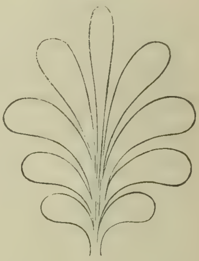


FIG. 8.



other side. Mechanical precision, in manual-training methods, is one of the faults of the day. It is mental discipline we need instead. I follow the Greeks. The Greeks were the greatest artists and workers in materials that the world has yet seen. When they made this form [drawing, Fig. 8], they never made those two sides absolutely alike, as artists making them to-day will do. Of all the forms they ever painted, modeled, or carved having that design, I never saw one that was mechanically balanced ; there was always enough difference to show that it was hand-made, as I made that. If you rule the lines, if you erect straight lines through them, and measure those spaces off, you may make a mechanical form, but it is not hand-made ; it has no flow of line, no graduation, or human beauty.

That form occurs on the top of the Parthenon, the greatest building of Grecian times. Very few people enjoy that design as an ornament, or know the reason the Greeks used it so much. You will find this upon almost everything that the Greeks produced in the way of ornament. I like to use this, because it is an ideal form ; it is perfect in balance, perfect in graduation, perfect in distribution of magnitudes, and it contains every element, from the straight line to the acutest curve and angle. I believe that is the reason why the Greeks used it so much. It agrees with all our ideas of form. It rays out as plant-forms ray out. I used it as an example in this case to show the fact that the hand in making these things freely as I do, without instruments of any kind, becomes more skilled than it can possibly become by the use of any method in which we have mechanical aids. Life is too short for a man to go through a course of carpentering or plumbing, mechanical drafting, and map- and plan-making to train the hand, which is the usual so-called method of manual training. After eleven years' experience, we have settled down at the Industrial Art School upon these four fundamentals that I have pointed out to you. If a person is able only to draw, it is of very little use. It is very little use to model only or to carve only. But if the individual does these four things in rotation, he becomes more nearly complete. In speaking to an eminent physician the other day, he said he thought modeling was an excellent thing, but he did not see the necessity of carving. Now if you can make a thing only in soft material, you have a certain amount of skill ; but if you are able to do it in tough oak as well, you have a great deal more skill. In modeling in clay you can add to or take away a little, but in cutting a piece of oak you can cut a certain distance only ; if you go a hair's breadth too far, the thing is spoiled. If, in addition, you can delineate a form on a flat surface, much greater skill is the result.

In conclusion, the idea of manual training, from my point of view, is so to train the hand by the working of materials of different kinds that they can minister to the individual and make him a more nearly complete and perfect man intellectually, physically, morally, and spiritually. No one can receive a good intellectual training alone without obtaining a complete mastery over some of his physical powers by skill in handicraft. By making things that minister to his wants, both useful and beautiful, he is compelled to work physically and intellectually, and this necessitates harmony in both bodily and mental powers.

The President. I have the pleasure of introducing to you Prof. Francis N. Thorpe, of Philadelphia.

Prof. Thorpe said in part,—

There was something about the old school system, charming as it was, which made us feel that after it was over there was coming a time when we were going to go out into the world and do something, to get down to employments which we felt would meet those wants in our own hearts which we daily felt, however foolish and boyish those wants were. Like an animal, a man has wants of an animal nature, and he also has spiritual, moral, political, and industrial wants which demand of him the exercise of harmonious and wholesome activities. When Socrates was a boy, I suppose that the old Greeks stood on the street corners putting hard questions to each other : whom they met they stopped, and thought him a fool if he could not answer their philosophical inquiries. How changed is the present ! An industrial age has transformed men into the makers of things, into an employed humanity seeking to satisfy the wants of society. If a thing is wanted, somebody will make it ; if not wanted, it is not manufactured for long. A system of education that is not founded upon the idea of equipping boys and girls so that when they arrive at mature age they can supply their various wants with relative perfection is a fraudulent education, I care not whether it is in the university or in the high school. We are now chiefly concerned in improving the present system of public education, and improvement must come by a wiser administration of the educational factors already engaged. A new and a better adjustment of the present educational forces will tend to a satisfactory solution of the problem. In the process of civilization the ornamental precedes the useful, and systems of education, like stages of civilization, must pass through savagery. Savagery hangs about us all in childhood, and if left to ourselves, and a long period of time for individual growth, we might pass through this stage and reach the age of manhood civilization. It is by an artificial, although, more truly speaking, by a natural method of training, that we try to shorten the period of preparation for real living. The problem may be stated as follows : "Does manual training offer the shortest, that is, the best way?" We believe that it does offer such a way, not wholly as Prof. Tadd has explained manual training, but allowing a wide place for the training which he advocates in the lower school, by the addition of a training in the use of tools, together with the most perfect training in the humanities,—history, language, science, and economy. To say that in manual training tools are of no account is to turn back toward the bushman who chews the tree off instead of cutting it down with a knife. I say that the tool-using and the tool-making man is the civilization-making man. If it is not so, let us throw away our mechanical tools, the pulley, the wedge, the hammer, and go back to our thumbs and fingers. A few weeks ago I met an eminent surgeon in his office, and every chair held a patient. If you were to go into that surgeon's laboratory, you would observe that he has fitted himself to make any tool that he may need in his practice. Whatever malformation he is treating, he has the art to form whatever appliance is needed in the treatment of the case. If he were not a tool-making and a tool-using expert, he would not be the master of the situation. It is as a public-school question that manual training possesses its intrinsic interest. Out of the public schools must come the recruits for all the social service. Your profession and other professions must be primarily trained in these schools. The number of boys and girls in this country who never attend the public schools is about nine per cent. (9.38) of the school population of the country, and any reason for introducing manual training into the public schools equally applies to the private schools. A manual-training school has various departments : literary, for the study of languages, literature, history, economy ; science, for the laboratory study of chemistry, physics, botany, electricity ; drawing,—machine, free-hand, architectural ; wood-working, carpentry, joinery, carving, turning ; metal working,—chipping, filing, brazing, smithing ; designing,—pattern-making, constructions ; engineering, specially electrical engineering. Each man at the head of these several departments must be a specialist, skilled in teaching. The training and the education afforded by such a school is an education and a training in the meaning and the use of principles. It is not to make artists, carpenters, historians, or architects : it is to teach the relations of society, the character of the individual, and his relations to his fellows, and to aid in equipping him to live a whole life. A school is much like a farm : there is as much in it as you put into it, and no more. Dr. Kirk's admirable paper is based upon two principles, brought out plainly in the article referred to by Prof. C. Handford Henderson, of Philadelphia : that manual training in its true spirit consists of the solution of two problems, one of which is ethical, the other utilitarian, in character. Manual training awakens some opposition among educators, whether professionally of the teaching class or of the official list, such as trustees and directors, because it trains boys in the knowledge of things. Such persons say at once, "A manual-training school is nothing but a trade school under a new name," or as Judge Yates wrote to Governor Clinton, concerning a proposition in the Convention of 1787, "It is pork yet, with only a change of sauce." To this objection we reply that the school is not a trade school, but we do not deny that there is a change of educational sauce. We reply, in one line of argument, that boys and girls are chiefly able to learn their relations in life, the nature of objects, and the properties and qualities of things, by the tactile power. That power interprets our wants and also aids in meeting them. The tool is a specialized hand, a refined adaptation of promiscuous muscularity, a trained muscular power. But manual training does not stop with merely a trained muscular power. In the process of that training, what changes are making in the boy himself? I must urge you to examine for yourselves what those changes are. There is not a branch of study usually pursued in schools which is not made of more direct use and to serve a clearer ethical purpose because of manual training. Manual training is only "mind training." Its detractors mistake the means as the end; they see only the application of the principle in the laboratory as they see the more elaborate application in the wareroom or the store. That manual training is a training of craftsmen and apprentices would be true were it to cease with the mere manufacture of articles of commerce. When such training becomes a process in manufacturing, then the school ceases to be a school for the study of principles, but becomes a shop or a factory. To men in your profession the introduction of manual training into the fitting-schools is more plainly defensible than to men not trained to be mechanical experts. What value would you attach to manual dexterity alone in the training of a dentist or a surgeon? As you intend to lengthen the term of your college course to three years, what value will manual training have for those who come up to pursue your enlarged and composite course? Are the young men who seek admission into your profession now well trained in the use of tools? Are they expert in the manual work required in your courses as they now are? Are their minds able to execute accurately the plans which even a person of average mental powers can plan? I state the whole problem of manual training when I ask, Does that training help a person to think? Thinking is training. Manual skill supplements clear thinking, but the processes of thought and manual training must proceed together; they cannot be divorced; a mindless surgeon or a mere theorist in surgery is alike unfit to practice his profession. If you advocate the introduction of manual training into the fitting-schools, you advocate the improvement of the profession to which you belong; you raise its standard of utility, you equip its schools with trained material, and you meet the wants of society more perfectly than those wants are now met. Given manual training in the fitting-schools, and every medical college and every dental college in this country will become in time the training-ground for the future experts, and not only of the experts, but also of that larger number in the profession who are not experts, but only safe surgeons or dentists. The result will be that the average practitioner under such a condition will equal the expert under the present *régime.* As to the cost of introducing manual training into the public schools, the best method of introducing it, the extent of its introduction, and the administration of such training, I may say that these elements are not now under consideration. As scientific men you should give your continued support to whatever modification of educational forces will ultimately improve the timber out of which dentists and surgeons are made, and also give higher value and power to the men in those professions.

Dr. A. J. Rickoff. Mr. President, I presume that your applause is a grateful recognition of the fact that I rise with my watch in my hand. What I have to say I will say in as few words as possible. Manual training, as defined by its advocates, is that training of the hand which brings it into subjection to the dictates of the mind as a mode of expression. It is claimed that this, in its turn, reacts upon the mind, requiring, as it does, as indeed all modes of exact expression do, a careful exercise of judgment, reason, and imagination in the elaboration of details. Facility of execution of the hand within its province should be cultivated, just as readiness and exactness of expression of the tongue or pen should be cultivated *pari passu* with the correlative faculties of the mind. It must have been observed by you, in the practice of your profession, that the hands of some men respond more readily to the dictates of the will than do the hands of others. It would almost seem as if the hands of some men did not wait for impulse from the council-chamber of the brain through motor nerves, but that they are self-active and self-determining. It is this almost immediate communication between the brain and the hand that we would cultivate by manual training, not for the sake of manual skill alone, but more that the mind, through the exercise exacted thereby, may be trained in readiness and precision of thought. This I say, because it seems necessary to denounce the idea that the advocates of manual training aim to supersede or in anywise belittle the study of language, science, or art. As an aid to all these it has its chief value. This exercise of the brain in expression of material forms through the agency of the eye and hand in and of itself exercises and trains the mind. It ought to be said that it is not safe to defer this training till special pursuits or professions require the exercise of manual skill, for experience in every department of education goes to prove that any faculty neglected in early life is apt to be lost.

The President. Dr. Atkinson will continue the discussion.

Dr. W. H. Atkinson. Mr. President and Gentlemen : I apprehend that the great difficulty is that we are dealing here with parts that depend upon each other as a whole, and the exclusion of any is inimical to our interests. That the hand can move without a power to direct it is in itself preposterous ; and that the hand is the only efficient agent has been very clearly set aside by the last speaker. I think anything that can bring to our minds what progressive manipulative training means must include the affections and the interests of the learner, be he old or young ; and the learner is practically young, no matter how many years he has lived or how many mistakes he has made. This is a subject which to us as operators speaks in thunder tones. It influences our daily work to such an extent that we cannot ignore it. We do know that our best operators have come not from the schools, so called, but from the handicrafts, from the various callings in life, from the men who prepare the forest to make the farms, and from the men who delve in mines and dig in the earth to meet the demands of human wants. It is a subject too important to be adequately presented in the time allowed. With your permission, Mr. Chairman, I will read a few notes respecting the points taken in the paper :

Manual training is per se *executive* rather than *perceptive*—mechanical rather than mental.

Perception is distinctly mental, though, to be sure, it needs executive acquirement to complete its meaning ; but manual training need not be mental to any considerable extent, and clearly and distinctly means what it properly is confined to,—routine, repeated, directed habiting of the muscles governing movements of the hands to accomplish results without special conscious mental action.

Attempts to divert definite and well-chosen words clearly expressing definite thought are unfortunate in their tendency to involve language in ambiguity.

The "manual-training idea" seems better expressed by *Kindergarten method*, which conveys both manual *and* mental aspects of education.

That the mental faculties are possible of development by *manual training alone* I believe to be not only unproved, but untrue on its own face.

That intellect of "zero quantity" contains *any* possibilities is very doubtful.

In this respect words become especially *comparative*.

Mimicry alone points to a possession of *something* above "zero."

Does Dr. Seguin claim *no* intellect in such idiots as were generally benefited by manual training?

Is there no interjection of personality of intellect by the teacher?

Has hypnotism any bearing on the results obtained with these poor creatures?

Manual training may be only and solely imitative, but as far as it departs from that expression, so far does it take on other aspects which to be understood must be further described.

At this day there are general theories of reflex action accepted, and to these may properly be referred the peripheral effect of the methodical repetition of manual action under outside mental influence.

The supremacy of the nervous centers does not seem to be overcome; rather is it a proof of lack of correlation of brain-action, because of central disturbance of structure or connection producing the idiocy *which* permits reflex action on motor centers.

Does the manually-trained *idiot* correlate mental action in other directions than distinctly in those which he has repeatedly imitated?

The recommendations for reform in laboratory work are admirable, and call for prompt fulfillment as fast and as fully as may prove practicable. The whole paper deals with an important matter in a well-digested manner, and calls for united effort for its indorsement and support.

It occurs to me as an illustration of the persistent *mechanical* effect of the repetition of muscle-action in the training of the hands (in the pursuits an individual secures his livelihood from) to note the gestures of speakers: the tailor, carpenter, farmer, will display his usual movements in his efforts to emphasize his remarks, and thereby disclose his antecedent occupation, even though far removed.

Dr. Frederick Peterson, of New York. Mr. President and Gentlemen: What is to me most striking in the paper and the discussion is the psychological principle which seems to underlie both manual and industrial training. Manual and industrial training to me are mere phases of what I would call muscular training. When we study the evolution of mind in a child, we learn that at first the child perceives with its sight and hearing, that it perceives color and light and sound; and it is only later that, by the movement of the eyes from side to side and up and down, it receives some ideas of the position of objects in space, of their bulk, their size, and general conformation; and in handling these objects later it learns through the muscular sense—a reflex expression of it—the shape, conformation, weight, etc., of objects, so that it is through those two avenues, both of them avenues of muscular sense really, that the child gains its entire knowledge of its environment; and not only of the environment outside of itself, but of its own body, and the position and use of its members. It is by the training and education of the muscular sense that we educate the intelligence, because there is a connection between muscular movement and an idea, so that we can speak of muscularity of thought or psycho-motor ideas. And the more this general muscular sense is educated, the richer becomes the store of intellectual capabilities.

It is hence that manual and industrial training are of the greatest importance ; and if such training could be carried out more carefully, as in these schools established in Philadelphia, it would be of the greatest advantage to each and every person, the doctor being no exception. There are innumerable ways in which manual training would benefit physicians by giving a readiness of judgment and quickness of action. It is an absolute necessity for the surgeon in order to be perfect in his science, a fact already commented upon. But there are special surgeons, among whom are the dentists, who require thorough manual training. Then there is the ophthalmologist, who is confessedly as yet unequal to the correction of certain ocular defects, because, as a distinguished oculist stated in this room recently, there are certain ocular defects which are as yet beyond the oculist's manipulative skill to correct ; even with his own wonderful dexterity in manipulation he was unable to cure them. Now, the pathologist is in another department of medicine that requires a great amount of manual training, more particularly in the finer studies of the microscopic character of the tissues. I think it would be fair to say that the great progress that has been made in the anatomy of the brain and spinal cord within the last decade has been on account of the great improvement in the manual and mechanical means of preparing and staining minute portions of the nervous matter.

There were some things in the paper which were particularly interesting to me : one in reference to the manual training of idiots and the insane. I had the pleasure of visiting, several years ago, an idiot asylum in Paris, the department of the Bicêtre, where the elder Dr. Seguin began his system of teaching idiots, and Prof. Bourneville, who is now in charge of it, kindly showed me the methods carried on there, which were such as have been described in the paper. Dr. Bourneville also had photographs of the children at different stages of their intellectual development, showing the physiognomic changes that had taken place under the moral and industrial training. Several years ago I was one of the physicians in charge of one of the insane asylums in this State, and we began a system of general moral training and industrial training. We started, in the first place, with a school of two hundred insane patients of all ages, and in addition to the other branches taught in a country school—reading, writing, spelling—we taught also various domestic exercises and occupations, such as basket-making and fancy work, etc., with good results.

The President. Dr. Kingsley's name has been sent to the desk as a gentleman who can enlighten us on this subject. We will hear from him.

Dr. N. W. Kingsley. Mr. President and Gentlemen : I doubt whether I can interest you very much, one reason being that you know me and have heard my voice so often that I can tell you nothing new. If I could talk an evening in Philadelphia, where I am not so well known, I might possibly interest an audience there, though perhaps not quite as much as the three Philadelphians have interested us to-night.

The paper is to my mind one of the hardest to discuss to which I have ever listened, because it seems to exhaust the subject ; but after listening to the speakers who followed Dr. Kirk, there seemed to be something to antagonize. First, in reference to the remarks of Prof. Thorpe, his speech was very witty and very funny, but it struck me as rather thin : it spread over all New York and took in pretty much all of Pennsylvania, the whole earth, and then the whole universe, except the paper. I thought his antagonism to the speaker who preceded him was a little out of place, because he offered nothing that was better. Prof. Tadd's illustrations, as well as his remarks, were exceedingly interesting and instructive. I wish to indorse all that he said. It is the correct method of manual training for every one who wants to prepare himself for the practice of dentistry ; that is exactly what I mean. It is exactly the kind of training to become skilled in our profession ; and one who is so trained, other things being equal, will make a better dentist than one-half of the men in this room. There is no question about it. Let me give you a little bit of personal history. When I was about seven years of age, my father furnished me with a pocket-knife. My mother thought it was very injudicious, saying I would cut my fingers. "Never mind," said my father, "if he does ; he will learn not to cut them." When I was eight years of age, I was whittling out little water-wheels and running them in a little stream that passed by our house. About that time I read in some book, published in Boston, something about how a clock was made ; it gave the principles, and I got some little round wooden wheels, on which ribbons come, and cut the notches out and made a clock with this same knife that my mother was afraid I would cut my fingers with. I did cut my fingers, but I was learning the use of my fingers ; and I have kept at it ; I have not left it off to this day. I believe now that any dentist who ignores the laboratory as not being high-toned enough for him is ignoring the place of all others that would give him the best opportunity to keep in good practice and to acquire the highest point of skill in any branch of dentistry that he may be following. Some years ago a friend of mine wanted to make a dentist of his son, and asked me to take him as a private student. I said I would when the time came, provided he was trained for it. I said, in addition to his foundation-work in the academy, let him undertake something that will be in the line of manual training simultaneously with his other studies: let him play the violin, the jews-harp, or the piano, take lessons in drawing, or a trade, something by which he will acquire skill with his fingers. That was carried out for two or three years, until it was proven that the boy had no interest in the use of his fingers; it was work, it was drudgery; so the proposition to become a dentist was dropped. I do not think he could have been trained to become a really skilled dentist. He would have made as good a dentist as the majority of dentists who have no special finger-training, who go to college and spend their time smoking in the laboratory and seeing others operate, and then hang out their signs. I tell all young men who come to me for advice, if they have not already acquired some manipulative ability with their fingers,—I do not care whether it is modeling or what it is, only so they have finger skill,—that if they have not acquired that skill, and it is too late to acquire it, they might better study law; that is the place for them. Gentlemen, you all know very well what my sentiments are on this subject. I indorse fully the idea of manual training as being first, second, third, last, and all the time in the preparation of a young man for dentistry; and the kind of manual training that Prof. Tadd has shown this evening is the very kind, if begun at the proper age, that will do more than any other thing I can imagine to lay a broad foundation for becoming a good dentist.

Dr. Ottolengui. Mr. President, I want to say a few words in regard to the remarks of Prof. Tadd. I watched his performances on the board with a great deal of interest, and I appreciate them very much. It is nearly twenty years ago that a certain cousin of mine married; he was fresh from European colleges, and filled with science. When his first boy was born, he looked up some books which he had seen in Europe to learn how to train his boy; he was going to bring up the child by a plan. It was hooted at. The first thing that he bought his boy was a blackboard, and the first thing he taught him to do with the blackboard was to draw circles, just as Prof. Tadd showed us to-night; drawing them both ways and with both hands at the same time. Now it seems odd that I, who had as a child shared the prejudice against the system of this scientific cousin of mine, should really be a better dentist to-day on account of the manual training he gave his child. Whilst I took considerable interest in what he had done, I was surprised to see this boy of seven or eight years of age originating some very beautiful and peculiar things upon the board. I about that time was going to college, and had learned to fill teeth with the automatic mallet; then I had to have a tooth filled for myself, and the dentist used the automatic mallet. I swore that I never would use the automatic mallet on any other man, as it is barbarous. Then the question was what to use in its place. In order to use the hand mallet, it became necessary to have an assistant to mallet for me or to be able to mallet for myself. That immediately made a reversal; while I had been using the mallet with the right hand, I had to begin to use it with the left. I tried it but could not do it. I told my cousin that I regretted very much that I had not been trained as his child was, to know no difference between the right and the left hands. He said it was not entirely too late yet. He then called his second boy, who was five or six years of age, and gave him a piece of thin paper and two pencils, and dictated a sentence. The boy started in the center and wrote away from the center with each hand. The paper was then folded over and the lines were held to the light, appearing almost coincident. This showed that the boy's muscles were trained in pairs, and he could do almost the same with one hand that he could with the other. It pointed out another fact, that while we educate a set of muscles we unconsciously or correlatively educate the corresponding muscles so that they may have their natural powers. We write with our right hand from the left side of the body across; and if you take the left hand and try to do the same thing, you are attempting something that the right hand never did; to write in a direction similar to that of the right hand with the left you must commence at the right and write toward the left side of the body; then you are using the muscles in the same way. In a short time I educated my left hand to write that way. Looked at as it is written it is nonsense, but reverse it and hold it up to the light and you see it is similar, and has the same characteristics as the writing of the other hand. It is a good point to show that the mind is educated through the hand. I systematically for several months practiced writing with my left hand, and then my manual training dropped off, and I used the left hand in my business, and do now use my left hand with the engine as well as I do the right. I want to say that that system of manual training is not as farcical as it looks.

Dr. W. H. Dwinelle. Mr. President, I think the ground has been fairly covered this evening, and I only wish to indorse the proposition that has been recommended with so much ability. It is essential we should commence early in the education of our hands, or we might as well dispense with it altogether. Those who commence early and follow it systematically and scientifically, as has been demonstrated to us to-night, will be most successful. One thought occurred to me during the discussion; it is this: that our hands and all parts of our mechanical system are called upon to express the ideas of the brain, of the soul, and are instrumentalities for that purpose. Our eye does not see; it is simply a camera-obscura that makes an impression upon the retina; the image is formed there upon the screen; and this retina itself is but an extension of the optic nerve, expanded and subdivided into infinite papillæ. The optic nerve does not see; the communication goes back to the seat of intelligent perception. The ear does not hear; it is a mere instrumentality. The auditory nerve itself does not hear. The impressions are carried back to the brain, and there the mind, the soul alone, perceives. The hand does not feel, with all its manipulative ability; it is a mere instrumentality, the expressive agent of the action of the mind for a purpose. The hand itself does not feel: it is the brain, mind, the inner consciousness, the soul alone, that feels and appreciates. And here is another idea: through the agency of our professional instruments we project ourselves still further—beyond ourselves, beyond our hands; we are thus enabled to give expression to the mind. The painter with his brush projects and extends himself beyond himself, so to speak; thus we are further equipped with instrumentalities which give a higher expression to the conceptions of the soul.

However, I will not detain you longer, except to indorse the paper, which has certainly given us a great deal of entertainment to-night. It not only contains trite and familiar ideas, but a great many that we did not dream of before. I am personally very much obliged to all of the speakers here; those who agreed and those who disagreed with each other. I like a little disagreement now and then; it develops new ideas; it induces discussion and leads to progress; if we did not differ, we should be but a milk-and-water people, without point or zest or sparkle in our natures.

The President. I will call upon Dr. Eisenbrey, of Philadelphia.

Dr. J. L. Eisenbrey. Mr. Chairman and Gentlemen: I have a great deal to say, because this subject cannot be exhausted, but I will detain you only two or three minutes. The benefit to be derived from physical training means more than hand skill: it means the training of the brain man, the mental man. While you may show the result of manual training in physical work, the result upon the brain does not come up until later on, lying back until the time called for it; and you find that the men who occupy a conspicuous place, the young men in our profession, are the men who have had that training. To lay the foundation of a broad and complete education you need physical training, whether you get it in the city or country. I do think that the country training is the best, from the simple fact that all over our whole land, all the five quarters of it, we find the places of trust in our banking institutions, the men at the head of our mechanical departments, and even in our schools of learning, we find that most of those gentlemen have been imported from the country, from the farms; they are men who handled the axe and the plow and the grubbing-hoe, that laid open the ditches and the swamps and made them fruitful pastures. Now, physical training does this: it develops a good condition of physical health, and that means a healthful condition of the brain man; and while it is a little slower to come at, still there comes a time when this healthful physical condition is shown in mental strength. Proper physical training implies that every one of us shall have proper food; for from that comes this good health by which the arterial tubes are expanded, the venous system is kept in good working order, and the capillary system, all of which develops the perfect man. Then with this training in our colleges, in our trades and offices,—I speak more particularly of the dental profession,—comes the perfect dentist. Without proper food and without proper physical training, from which comes mental training, you cannot have harmony with the great I Am, who is the creator and designer of the universe; you cannot have the perfect harmony nor the vibration that is necessary to the highest results. Mental training, if the physical training is out of harmony, is of no use; and manual training is only a means to the end.

Dr. W. W. Walker. Mr. President, in addition to the usual vote of thanks extended to the reader of the paper, I wish to make a motion that a vote of thanks be tendered to Profs. Tadd and Thorpe, of Philadelphia, and Dr. Rickoff and Dr. Peterson, of this city, for the very kind manner in which they have assisted us this evening.

Motion carried.

Dr. O. E. Hill. Mr. President, I can hardly go home without congratulating the First District Dental Society for bringing together the sharp minds that they have this evening. To me and to many of us this has been really a great treat; it is really a mental and physical development for us all. I thank you in my own heart cordially for what you have done for me.

Prof. Tadd. I would like to show you some work, without taking up more than a minute or two, in answer to Prof. Thorpe's discussion. These are designs [showing sheets] for work in materials, made under the system I have been advocating, and they are entirely original and made by children. We have nearly nine hundred children in the school, and they have never been allowed simply to imitate form in delineation, in modeling in clay, or in carving in wood. They must originate or create. [Drawing on board.] I give three elementary Greek forms, and from them they produce original Greek designs, making them balanced, symmetrical, etc.

Medical men know that if we do not use certain muscles they become stunted and useless. I find that most hand-workers and mechanical workers do not have what I understand some of you gentlemen and I mean as manual training; they are not skilled in the use of their hands, both hands, working with equal facility in all directions. Most workers to-day can do nothing without their tools. The tools are always used before the hand is skilled behind them. That is the reason I advocate the four fundamentals, even at the expense of some other training, because they save time. The hand, the eye, and the judgment being trained, then the tools of any or all trades will be handled with freedom and reason.

To conceive and create forms in material, of course, compels thought and the use of the brain. The organs of muscular sense—sight, taste, touch—cannot be brought into play without bringing into use the completest tool of all, the brain. Must it not in all its fibers be exercised and developed through the outer branches of the nerves extending to the very finger-tips, a ready instrument, instant and able to do the bidding of a skilled manipulator?

Nothing gives greater dignity to man than a complete realization of the power of being able *to do.* No joy is greater or more lasting than that received by doing well with the complete being,—brain, hands, judgment,—all tools; God-given tools to be trained and used.

Adjourned.

At the annual meeting, held April 8, a communication was received from Dr. J. M. Henriquez, Buenos Ayres, S. A., accompanied by a specimen of dental abnormality,—gemmated molars,—shown in the illustrations, which he presented to the society. The doctor gave the following history of the case: The patient, a lad aged sixteen, a native of Corunna, Spain, sought relief at his hands from a severe toothache on the right side of the inferior maxilla. The small tooth occupied the place of the sixth-year molar. On examination, the two teeth were found to be attached, and it was decided to remove them, which was done without difficulty. Fig. 1 is a perspective view of the anomaly, and Fig. 2 shows approximately in section the loss by caries, and the confluence of the pulp-canals of the united teeth. The doctor had previously extracted a superior left first molar which was quite normal, and the patient said that other molars which had been extracted did not present any abnormality.

FIG. 1.

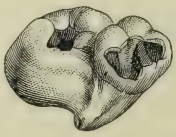
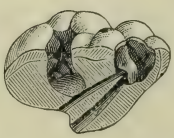


FIG. 2.



B. C. NASH, D.D.S., *Secretary.*

ALUMNI ASSOCIATION OF THE DENTAL DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.

The tenth annual meeting of the Alumni Association of the University of Pennsylvania was held at the Colonnade Hotel, Philadelphia, Wednesday, March 30, 1890.

MORNING SESSION.

The meeting was called to order at 10.25 by the president, Howard S. Seip, Allentown, Pa., who read his address, in which, referring to the growth of the association in numbers and importance, he urged upon all members the necessity of each taking an active part in the work, in order that the society shall make still further progress.

The greater portion of the session was occupied with routine business. Fifty-one new members were elected, of whom forty-one were from the class of 1890, and Drs. Robert Huey, E. C. Kirk, and John D. Thomas, all of Philadelphia, were unanimously elected to honorary membership.

On motion, the chair appointed Drs. McFadden, Hurd, and Jones a committee to nominate officers for next year.

Dr. V. S. Jones, Bethlehem, Pa., offered a resolution that the president appoint one member from each graduating class to be a corresponding member, his duties to consist in keeping a record of the whereabouts of the members of his class, to report once a year to the corresponding secretary, and to furnish information about the members of his class when called upon. The resolution was adopted unanimously, and the following were appointed: Class of '90, O. J. Eagan, Fall River, Mass.; '89, W. F. Faust, Pottsville, Pa.; '88, L. F. Tees, Philadelphia; '87, Chas. A. E. Codman, Philadelphia; '86, W. V. Bradley, New Haven, Conn.; '85, Grafton Munroe, Springfield, Ill.; '84, L. W. Skidmore, Moline, Ill.; '83, R. M. Scott, West Chester, Pa.; '82, G. L. Hurd, Lee, Mass.; '81, C. T. Howard, Rochester, N. Y.; '80, G. L. Curtis, Syracuse, N. Y. The corresponding members were also made the historians of their classes, and instructed to report every ten years to the society.

On motion of Dr. L. F. Jack, the executive committee and the secretary were directed to draw up a statement of the object of this association, to be published in the University catalogue and the *University Record*.

Dr. Rehfuss thought the association would be more useful if it held meetings oftener, say every month or two. He moved that the president be empowered to call a meeting as soon as practicable after the commencement of the next term of lectures, and that the holding of future meetings, whether monthly or every two months, be at the discretion of the president and executive committee. Carried.

Dr. Charles T. Howard, Rochester, N. Y., in a paper which was read by Dr. V. S. Jones, discussed the want of appreciation among graduates of ethics in dentistry. He contrasted the manner in which students entered upon the preparation for the practice of dentistry a few years since with the present method. The former method of apprenticeship in an office developed many able practitioners, but it was as a rule because the apprentice had in him the qualities which insured success in spite of the lack of advantageous educational facilities. In exceptional cases the preceptor was a conscientious and thorough teacher. The majority of such apprentices having neither the qualities which compelled success nor the training which made it probable, failed to do credit either to themselves or to their preceptors. With better methods and materials, and the teaching afforded in a well-equipped college, the proportion of successful practitioners is largely increased. As a rule, the least qualified to serve as preceptors have students constantly in their "dental parlors," while the thoughtful, practical operator is careful whom he admits as a student to his office, and seeks to learn the antecedents, qualifications, and intentions of the applicant. The dental college receives students alike from the "dental parlors" of the quack and the operating-room of the practical dentist, and does what it may to make them alike capable practitioners.

There is, however, room and need for great improvement in the methods of college training. The faculties and the profession are both awake to the necessity of improvement, but the profession is prone to be unjustly critical of the colleges. It does not properly appreciate the crudeness of the material with which they have to deal. What is needed is a better understanding between the colleges and the profession, and an effort on the part of each to act in harmony for the elevation of the calling. Students not properly qualified should not be received by the dentist for office-training, and if such apply for matriculation to the colleges they should be refused admission. It is unfortunately too true that the ranks of quackery are swollen by graduates of dental colleges. These bring disgrace not only upon themselves and upon the colleges whose diplomas they bear, but upon the profession as well. While freely admitting the value of the work done by the colleges, we are not blind to their shortcomings, and urge upon the profession the necessity of bringing to bear upon them the force of a united professional demand for a stricter preliminary examination and the unqualified rejection of all applicants not mentally and morally endowed not only with the qualities necessary for the practice of dentistry, but with a truly professional spirit.

The writer said this society, so far as he was aware, was the only alumni association which had adopted a code of ethics, and it has expelled members for not living up to that code. Its members are admitted to delegate bodies the same as those from regular dental societies. One of its principal objects is to do all in its power to help the institution from which its members came to keep in the front rank, and to so regulate admissions and teaching as to insure that every student who leaves its doors shall have not only a thorough understanding of his professional duties to his patients, but a correct appreciation of his obligations toward his fellow-practitioners.

Dr. Wm. Pepper, provost of the University, was here introduced. Dr. Pepper expressed himself as surprised and gratified by the large attendance of the members of the association, as it gave evidence of the interest of the graduates in their *alma mater*. We have to measure the success of an institution of learning by the interest which its alumni feel in its work. Not much value is to be placed upon large classes in attendance, as these may result from the most unworthy motives. The true measure of success is the interest the men who have attended it feel in the institution after they have left its classes and gone out into the world, where they are able to measure how well they have been taught, alongside of men who have been trained in other schools. He had not met with the alumni association of the dental department before, but if previous meetings have been like this gathering the society is to be congratulated upon its success.

No school can rest upon its reputation, any more than the individual man. As the man must continue to go on or else go down, so must the school constantly labor to enlarge its field, to increase its efficiency, and to augment the value of its training to those who receive it, or inevitably decay will set in. It must be ceaselessly alive to the requirements of the times, and not merely keep abreast of them, but always ahead.

It will scarcely be questioned that the practice of dentistry occupies a higher plane in America than in any other country, and for that reason those intending to pursue that calling come to America from all parts of the world to receive their dental training. No other department of the University draws so largely from distant lands in proportion to the number of students. We are about to establish a three-years' course, with preliminary examination, to increase the difficulty of getting a dental diploma. This step has been determined upon because we intend to maintain our position in the front rank of educators. He had not had many opportunities to meet with bodies like this association, and thus get at the real views of the dentists. He had worked a quarter of a century in medicine. He was fond of every branch of it, and he had been accustomed to think of dentistry as a specialty in medicine. But dentistry has introduced so many improvements and so enlarged its field of operations that it has almost established itself as a separate science. He hardly thinks the public appreciate the work it is doing; nor has it yet demanded the support and recognition to which it is entitled by right of the work it has done. Dentistry renders incalculable service to the people, and its representatives will find a general willingness to respond to any reasonable appeal to place dental education on a firmer basis.

The object of such associations as this is to formulate in some definite, articulate way the real needs of the department they represent.

There is room for greater advances in dental education, and the dental school which strikes boldly for reasonable demands will get what it asks for. This is the time. There seems now to be a crisis in dental education; the schools are about to change their courses, to lengthen the time of attendance required and otherwise increase the difficulty of getting the dental diploma, and it is likely that some will go down under the strain. They will probably all go into the new movement; some will flourish and some will not, and in a few years it is likely that an unfair competition will result, so that after a while it may be found that the dental diploma can be obtained without a very high standard of preparation, and then the schools which live up to the regulations will find themselves cut into by those which do not. We have never been able to bring the medical profession to united action, and it looks now as though the dental schools would lead the way to higher education.

There is another side to the question, the spiritual side. An endowed dental department would prove a help in the elevation of the tone of its graduates. When men, with love for their *alma mater*, have respect for themselves, they hold a power for good which is enormous, and with an endowed school behind them they would make that influence every year larger, more enthusiastic, and more powerful to draw men from greater distances.

In concluding, Dr. Pepper again expressed his pleasure at meeting the association, and his indebtedness for the opportunity of speaking. He had not intended to say so much, but he felt inspired when he looked upon the very large and enthusiastic audience which greeted him.

The secretary was directed to make proper application to secure representation of the alumni in the central committee.

The discussion of Dr. Howard's paper was then opened by Dr. J. C. Hertz, Easton, Pa., who agreed in the main with the views expressed in the paper. The point that the profession watches the colleges for every misstep, without due consideration of the human material with which they deal, is well taken. Dr. Miller, in the letter read by the essayist, appears to claim that the acceptance of none but college-bred men as students of dentistry will assure the universal observance of the code of ethics, which the speaker denied. The trouble is not lack of general education, nor is its cure to be found in the course suggested. Much of it is due to the inherent selfishness of the individual.

Prof. James Truman wished to protest against the idea which appeared to be uppermost in the paper, that the graduates of dental colleges are deficient in ordinary education. That seemed to him rather a slur on the dental graduates. For the Dental Department of the University of Pennsylvania he would say that he had been its examiner ever since preliminary examinations had been instituted, and he rarely had more than eight or ten students at a session whom it was necessary to examine. Nearly all of them bring certificates from the high school, the academy, or the college. He presumed that the experience of examiners in other schools was much the same as his. If this is correct, it is a proof that a new class of men is coming into dentistry. If the writer of the paper had been engaged with the young men studying dentistry, as the speaker has been for thirty years, he would not have put forth the sentiment he did. Some years ago, before he was connected officially with the University, he was appointed a member of a committee to examine the theses presented by the students of the graduating class. Each member of the committee examined the papers separately. He fixed upon two of them as superior to the others. One of these was highly wrought, full of thought, and beautifully worded. The other was not so well worded, but it was packed with original ideas, for which reason he favored giving it the first place. On conferring with the other members of the committee, he found that they had selected the same two papers as entitled to the honors, but they reversed the order of precedence, and the decision was so rendered. The writer of the first paper never succeeded in graduating from the University of Pennsylvania, while the other was the writer of the paper which had just been discussed. This incident only shows that the man of the best general education is not always the best in practical sense in our department of endeavor.

Adjourned to meet at 2.30 P.M.

Afternoon Session.

The association was called to order by the second vice-president, Dr. B. F. Place, Norristown, Pa.

Dr. W. F. Rehfuss, Philadelphia, read a paper on "Systemic Treatment: its Legal Aspect in relation to Dental Practice." He considered that the value of systemic treatment in various dental pathological conditions has not been duly appreciated by the dental profession, nor received the consideration to which its importance entitles it in the teaching in dental colleges. While the therapeutic value of certain drugs has been pointed out by various writers, there has been no systematic presentation of the subject. A familiarity with the indications for systemic treatment and the physiological action of remedies will often prove of great value to the dental practitioner, as in diseases of the oral mucous membrane,—ulcerative, mercurial, or syphilitic stomatitis, scurvy, gingivitis, pyorrhea alveolaris, etc.,—in diseases of the dental pulp, of the pericementum, in neuralgia, and in reflex odontalgia ; in the diseases incident to or coincident with the eruption of the deciduous teeth.

The dental practitioner should not only be able to intelligently diagnose the local manifestations of systemic conditions, and abnormal systemic conditions due to local lesions, but should have as well a knowledge of the therapeutic indications and the ability to meet the indications by prescriptions, whether of drugs, diet, or habits of life.

The legal right of the dentist to perform dental surgical operations and to treat patients systemically, and the legal protection afforded him by the degree of D.D.S., are subjects which have provoked much discussion. What are the limitations of dental practice? In other words, what may properly be considered as included in the professional duties of the dentist? The question is a delicate one considered with regard to the relation of the medical practitioner. Without question, all operations needed upon the teeth, filling, extracting, the correcting of irregularities, replantation, transplantation, implantation, the treatment of the gums, alveolar processes, antra, etc., are clearly within the limitations of dental practice. This frequently involves systemic medication in addition to the local surgical procedure under local or general anesthesia, when deemed necessary.

But whether in the treatment of the simplest dental lesion or of the most formidable complication, the dentist should be prepared to show that he has not only complied with the laws regulating dental practice in the country, State, and county in which he resides, but also that he possesses the knowledge and skill requisite for the proper performance of that which he has undertaken, and that he has used such knowledge and skill to the best of his ability. In the event of serious results following operation or medication, such a showing is necessary to avoid conviction upon a charge of malpractice. The field of dentistry is widening, and operations are now considered perfectly legitimate which a few years ago would not have been deemed allowable. The one essential requirement, applicable to dentists and physicians alike, is that he who undertakes the treatment of disease, whether local or systemic, must be prepared to demonstrate his fitness for the duties which he assumes, and that he has used due watchfulness and care in his procedures. If he cannot present such evidence, his diploma and his registration certificate will not avail to save him from judicial condemnation.

Dr. M. L. Rhein, New York City, read the following paper, entitled

THE VALUE OF INTENSE COLD IN DENTISTRY, AND ITS PRODUCTION BY THE CHLORIDE OF METHYL SPRAY.

The use of cold as a therapeutic agent is anything but new or novel. As far back as history can trace the art of alleviating human suffering, both heat and cold are constantly met with, and it is more than probable that their use in this connection antedated everything else.

The use of *intense* cold for producing local anesthesia by freezing was first called to public notice by Dr. B. W. Richardson in 1866. To him belongs the credit of introducing the spray of sulphuric ether. This was supplemented by Dr. Henry J. Bigelow's use of the rhigolene spray.

Both of these agents were used in dental practice quite extensively at that time, in the extraction of teeth. The gums were frozen, and the teeth removed with more or less local anesthesia. From recorded observations it appears that the ether produced the most satisfactory and uniform results. This may have been due to a certain amount of systemic effect produced by inhalation.

As a substitute for both of these agents, Mr. Jas. Arnott, of London, introduced bags of an ordinary freezing mixture of pulverized ice and salt.

Numerous appliances were introduced for the application of these agents; but with the advent of nitrous oxide their use grew gradually less, until at the present day the practice of extracting teeth painlessly by means of freezing the gums has almost entirely ceased. Nor is it the purport of these few remarks to advocate such a procedure, for we certainly have better methods at the present time. It is, however, a remarkable fact that of all the men who were producing local anesthesia in this manner for extracting, only two thought of extending its usefulness toward helping to preserve the natural teeth. If there were any others, they seem to have refrained from imparting their information to the profession at large.

Dr. J. R. Finney, of Youngstown, Ohio, writes as follows in the DENTAL COSMOS for December, 1866:

"I have been experimenting with the narcotic spray-producing apparatus upon sensitive teeth, and find that I can successfully clean and fill those teeth that have heretofore given so much pain to the patient and trouble to the operator." In the same number of the

Cosmos, Dr. J. H. McQuillen, the editor, has a leading article on the subject, in which he testifies to the correctness of Dr. Finney's statement as follows: "A few days since, in operating on a right upper bicuspid, in which the dentine was so sensitive that the patient could hardly bear the contact of the instrument, I employed the ethereal spray as suggested by a correspondent whose communication appears in this number of the Dental Cosmos, and found that the dentine could be excavated with no discomfort to the patient, immediately after the application had been made," etc. He also, in this article, advocates the use of the spray for extirpating living pulps. In speaking of the care requisite in the use of the spray, he says, "That unfortunate results may be induced on the part of careless or ignorant persons is beyond a question of doubt true; it is important to remember, however, that all inventions and improvements in the arts and sciences are liable to opposition from misapprehension on the part of those who, failing to recognize the true value of a discovery, magnify all apparent and intrinsic defects."

It is evident from these quotations that Dr. Finney wrote very briefly to Dr. McQuillen on this subject, and that Dr. McQuillen then tried it in his practice, and finding it successful indorsed it in the same number of the Cosmos in which Dr. Finney's short article appears.

That this never attracted much attention in the profession is plain from the fact that nothing more on the subject appears in our literature during more than twenty years. Even at this late day, this early mention of the spray in this connection was only accidentally made known to Dr. Ottolengui by Dr. F. T. Van Woert, who was turning the pages of the old numbers of the Cosmos about the time when Dr. Ottolengui was, as he thought, for the first time introducing the ether spray as an anesthetic for sensitive dentine.

We may, therefore, say that Dr. R. Ottolengui is entitled to the credit of introducing the use of the ether spray for the purpose under consideration; for the idea was not only original with him, but by persistent clinics and a number of articles written for the journals the profession was compelled to take notice of his views. This teaches the valuable lesson that new methods cannot be made to attract attention if written about but once.

Having witnessed Dr. Ottolengui's clinical demonstrations with the ether spray, I gave it numerous trials. It will almost invariably produce the result, but has numerous disadvantages, such as length of time required to attain the desired effect, and the consequent saturation of everything and everybody with the disagreeable odor of the ether. So much of it is required that it is difficult to strictly limit its action upon the part desired to be operated upon, and not by any means the least important objection is the inhalation of a very considerable amount of ether by the patient. The want of our present rubber-dam, together with the above objections, were undoubtedly the reasons why nothing further was heard of its use as a local anesthetic in preparing teeth for filling between the time of Dr. McQuillen's article in 1866 and that of Dr. Ottolengui in 1888.

In the endeavor to overcome these difficulties it was noted that all of the volatile liquids by means of their rapid volatilization would produce a degree of cold, the intensity of which was in exact ratio with the rapidity of volatilization. In this connection carbonic acid gas and nitrous oxide are superior to ether or rhigolene, and in the same manner is chloride of methyl superior to these agents because it abstracts the heat so much more rapidly on account of the greater difficulty of keeping it in a liquid form.

Chloride of methyl was discovered in 1834, and while at that time its production was complicated and expensive, it is now manufactured cheaply in Paris from the remnants of beets after the sugar has been extracted. For a more complete résumé of this agent and its usefulness, attention is called to an article by myself published in the *Dental Review* for September, 1889, and copied the following month in the *British Journal of Dental Science.*

Assuming that you are all familiar with current dental literature, I will only take up a short time in recording recent results of my observations and the deductions made from them.

Having used the chloride of methyl for over one year and in over three hundred cases, I speak with the confidence that the long use of one article or method will alone assure.

Later observations have only strengthened and confirmed my views as heretofore published.

Not a single case of death of the pulp has resulted. In a small percentage of the cases where the cavity extended near the pulp there has been a certain amount of subsequent irritation, which has invariably passed away within a few days. This irritation is almost invariably met with in such teeth whether the methyl be used or not. Still, it is in these cases of close proximity to the pulp that it should not be used unless absolutely necessary, and then with great caution. This is the only class of teeth in which any bad result is to be feared ; nevertheless, while using it frequently in such cases, I have no dead pulps to report. Its most valuable and beneficial effect is met in excavating in the interglobular spaces between the enamel and dentine. These too often acutely sensitive places can be prepared, the patient not feeling the slightest touch of the instrument.

In youthful patients the methyl should be used with great caution ; while with more elderly parties much less care is required. In fact, the greater the density of the tooth-structure, with so much more impunity can the methyl be used.

The chloride of methyl was employed in the removal of twenty-one living pulps. In eleven cases extirpation was accomplished without any pain ; in five there was some slight sensation toward the close of the operation, but not of sufficient amount to annoy ; in three cases only a partial anesthetic effect was produced, and in two (among the very first) it seemed to be entirely ineffectual. It is my present belief that the methyl was not well applied to these two cases ; they were posterior teeth, and difficult of access with the means at my command at that time. It was invariably successful in the anterior teeth, and less so as it was used more posteriorly. On the molar pulps it was least efficacious. In old people it worked like a charm. The history of one case seems worth recording.

Mr. N., a young German, age about twenty-four, while engaged in a street fracas had four-fifths of the crown broken from each of the superior central incisors. He made his appearance at the office suffering severely from the exposed pulps. The rubber-dam having been adjusted, the spray was applied to the exposed pulps with full force, resulting in the patient's agonized expression changing almost instantly to one of calm repose. By means of repeated applications of the spray, every vestige of two remarkably large pulps was removed without any return of sensibility to the parts. The roots were immediately filled at their apices, and on the following day two Logan crowns were inserted, to the patient's great delight.

The methyl having been once applied to the pulp, it should be re-applied as soon as the faintest sensation is apparent. In this manner the operation can be prolonged an indefinite time. The greatest obstacle to the successful use of the methyl in pulp-extirpation is the formation of ice in the canal. If at the first twist of the broach the entire pulp has come away, the operation is invariably a success. When, however, the pulp is lacerated and considerable hemorrhage ensues, the application of the spray causes the larger end of the canal to become packed with ice, and this is a serious obstacle to the passage of the broach.

In the treatment of neuralgias the methyl is invaluable. It will almost invariably bring about an immediate relief from pain, if not an absolute cure. Attention is especially called to its wonderful efficacy in relieving the various headaches resulting from peripheral irritation around some portion of a tooth, be it an exposed pulp, pericementitis, an alveolar abscess, or the result of some medicinal irritant. To cite a case : Miss K. was sent to the office suffering with severe odontalgia in a superior lateral. Diagnosis of suppurating pulp under a gold filling. On entering the pulp-chamber there was a free discharge of ichorous pus, which soon brought relief to the patient. The opening at the foramen had become considerably enlarged, and though the hydrogen peroxide was injected very gently, yet the irritation resulting around the apical space produced a severe headache. This was instantly dispelled by the spray of methyl.

In conclusion, I have a few words to say which I wish could be heard by the entire dental world, and especially by those opponents to progress who listen to essays and watch clinics not to extract the good that is presented, but with eagerness only to point out what in their narrow views may seem to be objections, and when the objections are met still prefer the old way.

The crying need of the hour in dentistry is *anesthesia* for *sensitive dentine*. All the progress of medicine may truly be said to depend on the discovery of anesthesia. Surgery depends entirely on it in its greater aspect, and through its aid thousands of lives have been saved which would otherwise have been sacrificed.

Similarly with us. It is a world-wide cry against the dentists that they torture their patients. Those of strong physique submit and endure the agony entailed in dental operations. With a second class this is simply an impossibility, and thousands of teeth are neglected and lost from this cause, even though the patients may be able to pay for our most skillful services. Then there is a third class of patients: those who after months of torture in anticipation finally come into our hands, and with nerves strung to a hurtful point pass through the ordeal and have their teeth saved, but at what a cost! We do not sufficiently consider the consequences of shock in the dental chair. Yet undoubtedly many suffer for months and even years from injuries to the nervous system received whilst in our hands.

The greatest duty of our profession to-day is to discover and adopt a mode of painlessly performing our operations. This discovery has been announced so often that you have reason to doubt each new method that is offered. But for all that you owe it to yourselves, to your profession, and more than all, to your patients, to investigate the claims which I make here to-day, and to adopt whatever is beneficial therein if your experience shall be in accord with my own.

Dr. E. C. Kirk, Philadelphia, in opening the discussion, said that the compound under consideration is one of the substitution products of marsh gas. Methylic chloride under a pressure of two and one-half atmospheres is a liquid of a volatile nature which boils at about 40° C. It is unique in occupying a position just between the liquids and gases, ready to be volatilized when released. The difference between its physiological action and the properties by which it produces such extreme cold should be noted. When he first heard of its use for the purpose indicated in Dr. Rhein's paper, a prejudice against it was formed in his mind, due to his having seen bad results from the use of the ether spray for obtunding sensitive dentine. One case he recalled in which it caused disaster not only to the molar to which it was applied, but also to the two adjoining bicuspids. Such facts made him fear any agent whose action could not be limited. He, however, procured the apparatus for exhibiting the chloride of methyl because he wanted for another purpose such a degree of cold as it would produce, and having it, he was led to make an application of the medicament in a case of pulpitis. The effect produced convinced him at once of its efficacy. So far, all the cases in which he has tried it have been those in which there was pulp-exposure. One case was where a patient had an exposed pulp in the second lower molar on the left side, and following the exposure a severe otitis ensued. He applied a sedative, and twenty-four hours afterward made the usual arsenical application. In one and a half hours violent pains were set up, which cried aloud for relief. The cylinder of methyl chloride stood handy, and he made an application of the cotton pellet saturated with the agent, and the pain vanished. He removed the arsenical application while he held the cotton to the tooth, and twisted off the pulp the same as in other cases. Ever since he has been using cold pellets freely for aching teeth ; but his doubt as to the limitation of the effects still prevents his using the agent for the purpose for which Dr. Rhein recommends it, so that he has not yet tried it for obtunding sensitive dentine. He hesitates to use it for this purpose because a temperature of —40° C. can be produced by it, a temperature sufficiently low to freeze mercury, and the effect of which upon living tissues can only be conjectured ; that is, if this temperature is produced when it is used in the manner indicated. Dr. Rhein may have means of controlling its action so that this temperature is not reached. He had used it only yesterday in a case where inflammation was set up after the capping of a pulp, and it relieved the pain at once. So far as he has gone with it, he can bear out Dr. Rhein's statements.

Dr. Rhein, in reply to the suggestion of injury to the pulp from such extreme cold, would say that he would not use the drug where there is an exposed pulp. The manner and the cases in which he uses it are detailed in the paper. He would not even use it in a cavity where he could see the line of the pulp through the intervening dentine, but where that line could not be seen he considered its use perfectly safe. The fact that where extreme cold has been applied to the living pulp for the purpose of extirpation of a portion of it the pulp will return to sensibility, shows its wonderful recuperative power. He has looked carefully for dead pulps following the use of this agent, some of the cases having been under observation for more than a year, and he has seen no bad results. He hoped that Dr. Kirk would try it on sensitive dentine.

[Dr. Kirk then demonstrated the capacity of the agent in producing cold by freezing water in a test-tube to a solid mass in a few moments.]

Prof. Truman had opposed some of the points in Dr. Rhein's paper when he heard him on a previous occasion at Asbury Park. He did not find fault with this agent in particular, but generally in regard to the action of extreme cold on living tissue. If Dr. Ottolengui did not know the objections to this method of treatment, that was his fault. There is no more effective agent for reducing pulpitis than the rhigolene spray, but on the other hand, when such extreme cold as it produces is applied to a living pulp, the laws of physiology are violated. Such cold will produce death and sloughing by one minute's application. All through the tooth are minute prolongations of the pulp, and anything that acts upon them certainly acts upon the pulp directly. He cannot understand how a degree of cold so intense when applied to the tooth will not produce destruction of the pulp. It is like other tissues, composed of nerves, muscle, blood-vessels, etc., and it may be more highly endowed with resistant powers than other tissues, but it must suffer under such circumstances. It is for this reason that he objects to its use, and the class will bear him out in the statement that he barely mentions it in his lectures.

Prof. Chas. J. Essig finds much in the quickness and delicacy of the operation of this agent to commend it. The production of local anesthesia by cold is not new. From 1866 to 1868 almost every one in practice used the ether or rhigolene spray for that purpose, but there is a vast difference between these and the agent now under discussion. They occupy two or three minutes in producing the effect; this acts almost instantaneously. The moment it is applied the effect is shown upon the periphery of the pulp-prolongations, without being continued long enough to be carried to the main body. Now, it is a fact that the teeth are constantly subjected to the most violent extremes of temperature without apparent injury. Hot tea or coffee and ice-water are not infrequently taken at the same meal, and the fact that the teeth do not suffer is evidence of the inherent vitality or recuperative power of the pulp. The great merit of this agent is the quickness of its operation, for which reason he conceives it to be the best he has ever seen for the purpose for which it is used. He can readily see how death of the pulp may be produced by rhigolene or ether. It takes them so long to produce their effect that their action is diffused and carried along to the pulp; while this acts so promptly that its effect is all felt near the point of application. He compared the chloride of methyl with a keen-edged instrument which does its work thoroughly and quickly.

For his own part he does not have much trouble with sensitive dentine; it is not by any means the most extensive trouble he encounters, though it occasionally occurs, and in such cases this agent appears to have a place.

Prof. Truman. Does not the action of this agent extend to the pulp?

Prof. Essig had only stated his impressions. He sees no reason why the action cannot be to a certain extent limited.

Dr. Kirk had the same idea in mind. He had said that the effect of an application of this agent might extend far beyond the needs of the case, but the size of the pledget of cotton is of itself a limit to some extent. If the temperature is carried as low as it possibly can be by this agent, say —40° C., there are two things to deal with, quantity and degree of cold, but the quantity is so small that on becoming reheated it is not able to diffuse itself very much. He has been in the habit of treating pulpitis by cold, that is, by gradually lowering the temperature. So his first application of this agent was very slight, and the pain was merely increased; he next applied it directly to the inflamed pulp, and the pain was controlled at once. The best way to decide the merit of anything is to test it. So far he has used chloride of methyl only in those cases where he intended to remove the pulp.

Dr. Rhein was much pleased with the tenor of the discussion. Prof. Essig had stated clearly what he had himself intended to tell as to the difference in the time of the action of the agent now under discussion and of those formerly used. As to the objection by Prof. Truman that it may cause injury to the pulp, all he had to say was that he had used it more than a year and he has not yet seen a dead pulp from its use; but he does not use it near healthy pulps. In one of the cases cited in the paper the pulps were so large that he failed to remove all of either of them, except after several trials and reapplications of the agent. The patient absolutely felt no pain as long as the effect of the application continued, but he found evidence of returning sensibility whenever he let up on it for a moment. He does not advocate the use of this agent for every case. He only uses it in refractory cases, especially those where there is sensitive dentine around the necks of the teeth, and in these it is perfectly effective and there it is used with perfect impunity. He has abandoned the method of applying it on a pellet of cotton, and finds the application of the spray directly upon the sensitive dentine is more effective. He gives the full force of the spray at once, and the action is instantaneous. He has patients who have been with him ten years whom he could not control until he used this method, and now they are as easily handled as any. There is some pain accompanying the application, a certain amount of shock which varies with the individual. Curiously, very nervous patients who require it most bear it best, while those who stand ordinary operations readily without it suffer a little more when it is applied. He has used it upon this latter class more to satisfy himself as to its effects than because of any need for it.

Prof. Essig. The freezing of tissues, if done quickly, does no harm. In the old days of the use of rhigolene he used to freeze his finger occasionally until it was quite white, and upon ceasing the application the sensitiveness soon returned. In 1881, while in Europe, he saw a young man who was so badly frozen in making the ascent of Mont Blanc that he lost his toes. He believes it is long exposure to the cold which does the damage ; that a brief exposure even to intense cold does no harm, because there is no time for the effect to become diffused.

Dr. G. L. Hurd, Lee, Mass., read a paper the object of which was to show that the teeth of future generations should be an improvement on those of the present day, and how such a result may be attained.

Among the agencies which are slowly but surely leading to a betterment of the dental organs are the spread of information among the people and their appreciation of the necessity for early and systematic professional attention to the teeth of children ; improved methods of treatment ; a recognition of the influence of proper and improper foods ; a conviction of the necessity for habitual and intelligent care of the teeth ; the influence of the health of the mother upon the dental outfit of her offspring ; the advantage of the proper feeding of the mother during gestation, and the amount of thought which is being given by the profession to the problems presented in the daily vocation of the dentist.

Prof. Truman. The whole question of the degeneration of the teeth is one which requires much time and thought. He is not one of those who regard the degeneration of the teeth of which so much is heard as one of the laws of the universe, or of those who argue that the time will come when the human race will be edentulous. If we go back to the teeth of pre-historic man as seen in skulls yet preserved, we find precisely the same characters as are seen in those of to-day. So also in the teeth of the mummies. If we examine the teeth of all races in all climates and all lands, we find the same conditions. We don't see so much of this degeneracy as we hear of, but we do find it in American teeth. The teeth of the European nations are denser, harder in structure than those of the Americans. Whatever the cause of the inferiority of American teeth, it is local, and it shows a lack of equilibrium in the development of the type, inseparable from the beginnings of a mixed race, as we are ; but after a while the equilibrium will be established, and the type of teeth which will prevail will be known as the American type, which will not be inferior to those of other races. It is even now growing.

He does not regard the feeding of teeth as of as much importance as some do. The essayist spoke of the prescribing of the phosphates for the mothers. The speaker is of opinion that ordinarily we get enough and more than enough inorganic materials for the needs of the system in the usual foods. The exceptions are unusual cases. The teeth can be fed, but it is not necessary, and it cannot be done by the administration of lime-salts. The nutrition of higher organisms must go on through the lower forms of life. As for help in building up the teeth through the medical men, he had lost all faith that that will ever be accomplished. The last thing that they will ever study will be the condition of the oral cavity, and it will rather be the province of the dentist to instruct them, though there are some medical men who are beginning to think that the mouth is of some importance and that medication should begin at that point, but they are not numerous.

Dentists must remember that in the treatment of diseases in their specialty they may produce pathogenic disturbances by their own actions. To avoid such a possibility, antiseptic precautions must be carried out thoroughly in every operation.

A paper by Dr. Grafton Munroe, Springfield, Ill., on the "Care of the Teeth during Dentition," was read by title and ordered to be printed in the society's report of proceedings.

The nominating committee reported the following names to be voted for for the various offices: G. L. Hurd, Lee, Mass., president; Grafton Munroe, Springfield, Ill., first vice-president; B. F. Place, Norristown, Pa., second vice-president; O. J. Eagan, Fall River, Mass., third vice-president; W. L. Winner, Philadelphia, recording secretary and treasurer; H. B. McFadden, Philadelphia, corresponding secretary; Meyer L. Rhein, New York City, orator; Ambler Tees, Jr., member of the executive committee.

On motion of Dr. Codman, the report was adopted and the secretary was instructed to cast the ballot of the association for the gentlemen named, which was accordingly done and they were declared duly elected.

Adjourned.

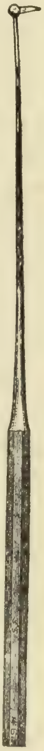
The annual banquet was held at Boldt's restaurant in the evening.

Over one hundred members and invited guests of the association were present. Speeches were made by Dr. S. B. Bartholomew, of Springfield, Mass., Dr. Edwin T. Darby, of Philadelphia, and Dr. O. J. Eagan, president of the class of '90, and the annual oration was delivered by Dr. W. F. Rehfuss.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At a meeting of this society, held April 8, 1890, Dr. W. H. Trueman stated that a few weeks ago Dr. I. Wilson Moore, of Philadelphia, gave him a valuable suggestion. He said that several years ago he was called upon to add a small portion to a large contour filling in an upper central incisor, to replace the corner of the tooth which had been broken off some years after the filling had been inserted. The position of the required addition was such that he had either to rely upon the new and the old gold uniting firmly, or to remove nearly all of the old filling, which was large and in excellent order. In addition to the labor involved, there would have been considerable risk to the remaining portion of the tooth in its removal. He applied the rubber-dam, and after carefully cleansing, with absolute alcohol and chloroform, the portion of the filling to be operated on, and thoroughly drying with bibulous paper and the hot-air syringe, he repeatedly failed to make the new gold adhere, although the surface was well roughened and such retaining-pits made as the case permitted. Presuming that this failure to unite was due to the presence of moisture, he resorted to the following expedient: He formed at the end of a fine probe a minute ball of cotton—as shown by Fig. 1—about the size of a large pin-head, dipped this into alcohol and ignited it, allowing it to burn until the alcohol was partly exhausted, so as to have the flame more under control, and then held it immediately under the prepared surface of the filling, allowing it to remain until the patient gave sign of discomfort. This was repeated several times. He found that he was able to make the filling quite hot without inflicting more than very bearable pain. He then proceeded to pack upon it the new gold, and found that it united quickly and firmly, and the operation was completed without the slightest difficulty. In finishing the filling he severely tested the union, and found that it stood the test thoroughly, and when finished the joining of the new and the old gold could not be distinguished. He had recently examined that operation, after two or three years' service: the two portions of the filling seemed to be as thoroughly one as though all the gold had been inserted at the same time. He had since repeatedly adopted the same expedient in similar cases, and always with success. He thought that by these means not only was the surface of the gold thoroughly dried and cleansed, but it seemed to him that the little burs and fibers of gold raised by the roughening of the surface, and perhaps also the surface of the filling, were annealed, and the union of the new and the old gold thus facilitated.

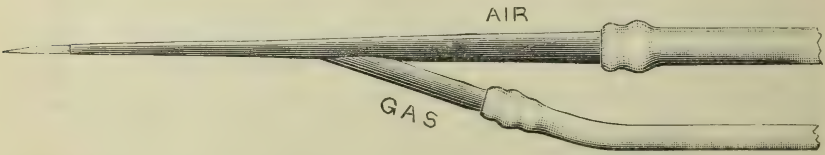
Fig. 1.



He had found another use for this novel mode of applying heat. In using gutta-percha for inserting crowns, the gutta-percha occasionally becomes chilled before the crown is fully in place. To remedy this, Dr. Moore has his little ball of cotton all ready, and if the crown fails to go well home, the difficulty is overcome by a few moments' application of the alcohol flame to the crown, while in position in the mouth, without loss of time, with far less discomfort to the patient and with more satisfaction than by withdrawing and again heating it.

Dr. Trueman thought the suggestion a very practical one, especially for inserting crowns, or removing crowns secured with gutta-percha. His last patient that day required the removal of a crown to correct the alignment. He had been in the habit of softening the gutta-percha in such cases by applying to the crown a heated instrument, of which he had had two made for that purpose, so that the heat might be kept up by their alternate application, as they became chilled. These were effective, but it took considerable time, and in many cases it was difficult to sufficiently heat the crown without causing discomfort to the patient. Modifying somewhat Dr. Moore's suggestion, he used a wax spatula, of English make, intended for laboratory work, which is kept hot by a minute gas-jet. The device consists merely of a small brass tube passing through a wooden handle, one end of the tube being provided with a minute hole, while the other has a swell end over which small rubber tubing is stretched from any gas-burner. A minute flame issues, which keeps the spatula warm. The spatula is kept in place by a small thumb-screw. Removing the spatula and reducing the gas-jet until it was a mere point, he held it immediately under the crown, and in less than a half-minute the gutta-percha was sufficiently softened to permit its ready removal; this, too, without the slightest discomfort to the patient. The use of a minute gas-jet, (Fig. 2) where gas is available, may be an improvement, but Dr. Moore's ball of cotton saturated with alcohol can always be had, and is simple and effective. He regarded it a valuable and happy suggestion, for which Dr. Moore deserves credit.

Fig. 2.



Dr. W. H. Trueman then read the following paper, entitled

Copper Amalgam, its Virtues and its Vices.

When copper amalgam was, a few years ago, introduced to the dental profession of this country as a suitable material for filling teeth, it was claimed to possess, among others, the following decided advantages over other amalgams :

1. It changed its form during the process of crystallization or hardening to a less degree than did other plastic metallic compounds, neither expanding nor contracting to an appreciable extent, and having little or no tendency to assume a spheroidal form, as some amalgamated alloys are supposed to do.

2. While usually quickly changing color upon its exposed surface, in many cases becoming absolutely black, it did not discolor or stain the tissue of the teeth, the only change in the color of the tooth produced by its presence being that due to the translucency of the tooth-tissue.

3. That it was a better tooth-preservative than any other metallic filling in that, in addition to the protection afforded by its making a perfectly-fitting filling, it possessed an antiseptic property that of itself prevented the recurrence of decay.

4. That it was permanent.

These claims were decidedly taking, especially as they were strongly and well indorsed. So slowly do the vices of this compound develop, that it was in my own experience, although using it largely, several years before I had reason to question them ; so long, indeed, that I could hardly realize that the deficiencies noticed were inherent in the compound and not due to accidental or avoidable causes. I presume a similar experience on the part of others has led to its unqualified indorsement, and has delayed until very recently adverse criticism upon its merits.

At this point I wish to explicitly state that the material under consideration is the amalgam made by uniting under suitable conditions finely divided copper and mercury. This is allowed to harden, and to so remain until required for use. It is made plastic by the application of heat and trituration in a mortar immediately before being inserted in the cavity. My remarks have no reference whatever to the amalgams of which copper is a component part of an alloy to which mercury is added immediately before being used. This explanation is necessary, as the latter is occasionally advertised and referred to as "copper amalgam," and in several articles I have read upon this subject that is evidently the material of which the writer speaks when using the term "copper amalgam." To avoid confusion the term "copper amalgam" should be restricted closely to the amalgam containing copper and mercury only, an amalgam that is peculiar and distinctive, and has little in common with the amalgamated alloys.

The first claim I fully concede : it is a distinctive characteristic of copper amalgam and constitutes its chief virtue. The expansion and contraction and the hardness of the amalgamated alloys depend greatly upon the proportion of mercury they contain : a very little more than enough seriously impairs their usefulness. I have long been impressed that the imperfect edges of amalgam fillings otherwise in excellent order are due in many cases to the amalgam in immediate contact with the walls of the cavity containing an excess of mercury, the process of packing it into the cavity naturally forcing the surplus to this portion of the filling and forming in immediate contact with the walls of the cavity a layer of amalgam containing so much mercury that it not only contracts in hardening, but it never becomes as hard as that in the central portion of the filling, which as the natural result of this unequal distribution of the mercury contains less.

In all amalgams, without exception, a certain and fixed portion of mercury combines with the metals and cannot be expelled without breaking up the compound. An amalgam, however, containing no more than that amount would be useless for dental purposes. An excess or surplus is necessary to render it practically workable, the amount of this excess or surplus that may be permitted to remain without impairing the usefulness of the amalgam being determined by the metal or alloy combined with the mercury. This excess is to a certain extent practically essential to the amalgam ; it forms, however, the unstable and changing element with which we have to deal, and has much to do with the variable behavior of amalgam and amalgam fillings. It is only when the excess becomes excessive that it becomes objectionable. It is possible, however, for the mass of the filling to contain no more than a permissible excess of mercury, and yet it may by its unequal distribution throughout the mass seriously impair the usefulness of the filling. To a certain extent the mercury tends after the filling is completed to "soak" through the mass and to correct this ; this tendency is much more limited in the amalgamated alloys than in the copper amalgam. Copper amalgam in the condition in which it should be used for filling teeth takes up mercury with so great an avidity that I question if it would be possible to make a filling, however large, that was not in this respect homogeneous. Again, within wide limits the proportion of mercury seems to have no appreciable effect upon its hardness, or its contraction or expansion,—indeed, not until the excess of mercury is so great as to render it too soft and plastic to retain its form. The combination of these two properties, in my judgment, is the only real virtue possessed by copper amalgam. Except that it requires a longer time to harden and the risk that it may receive injury before the hardening process is complete, a filling in all respects as good may be made with copper amalgam containing enough mercury to render it sufficiently plastic to work kindly as with the same amalgam from which the excess of mercury has been so completely expelled that the mass is in a barely workable condition ; in the latter case the filling immediately upon completion is harder, and reaches its normal degree of hardness in a less time, and is therefore less liable to accidental injury during the interval.

The second claim I decidedly dispute. For several years I failed to notice any marked cases of teeth discolored by copper amalgam, but have since seen enough to be fully convinced that it is only a question of time. It does stain tooth-tissue, and is quite as if not more objectionable in this respect than most of the amalgamated alloys. Especially is this the case when it is combined with other filling-material. In a number of cases in which I have used it in combination with gold, the copper amalgam being first inserted and allowed to harden, the teeth have been stained a peculiar gray-green throughout their entire substance, the color extending far beyond the tissue in immediate contact with the copper amalgam portion of the filling. A lining of zinc phosphate cement has proved but little protection. It does not always stain the teeth, but I am finding that those which have been the longest inserted are more frequently discolored, and in several instances teeth that I examined and found unchanged in color two or three years after the fillings were inserted and so noted, are now, after an interval of a few more years, badly stained, presenting an appearance very similar to that produced by the coin or precipitated silver amalgam of half a century ago. In most cases the exposed surface of the filling becomes quite black, in some cases a light gray color only, and in a few it remains clean and bright. I have not found, however, any relation between this and the discoloration of the teeth ; nor do I find the discoloration due to the translucency of the tooth-tissue. It is a real, absolute, permanent, and penetrating stain. I have seen too many cases to entertain the slightest doubt upon this point.

In regard to the third claim, I am not convinced that copper amalgam has any greater tendency to retard or prevent the recurrence of decay than any other material that makes an equally tight filling. In my judgment its antiseptic properties have not, practically, the slightest value.

The fourth claim, its durability, it is fairly entitled to. No filling-material with which I am acquainted can be considered absolutely permanent ; apart from its being released by recurring decay, or forcibly dislodged, each material has its own peculiar weak points. Gold, however carefully impacted, may disintegrate either from unappreciated defective manipulation or the peculiar forces brought to bear upon the finished filling ; the cements undergo chemical solution, gutta-percha and its allies mechanical abrasion, and copper amalgam also has its own peculiar distinctive failings. How far these may be due to unappreciated, undiscovered, and possibly avoidable causes, or how far they are inherent in the material itself, I am unable at this time to determine. I have noted first a gradual wearing away, the filling after a time presenting very much the appearance of a gutta-percha or cement filling partly worn out. This is not due to attrition, nor to any want of hardness in the filling, but is, I think, a chemical solution. It has been noted that those copper amalgam fillings that quickly turn black are not liable to this change, but only those which retain their color or are discolored but slightly. This accords with my own experience. It has been suggested that this may form a reliable rule to determine whether copper amalgam is suited to the mouth or not. If it quickly turns black, it is safe to use it, and it will likely prove in that mouth a reliable filling. If it retains its color, its use in that mouth is contra-indicated. This is probably a fairly safe rule ; it is not, however, infallible.

I have found that some fillings that do turn black after a few years disintegrate and break up ; why, I do not know. It may be, however, that during the excessively long time required for copper amalgam to harden it is, in localities especially exposed, injured by the pressure of the tongue as it instinctively seeks those points that do not feel quite natural, or by the fingers or toothpick of inquisitive patients, or the pressure of food in mastication, etc. ; these may, and doubtless do quite frequently, injure the filling, and at some stage of the hardening process may completely ruin it. It may be that this has been the case with some of those referred to, the initial injury being so slight as to escape notice. I do not think it accounts for all, but am unable at this time to present a more plausible explanation. I have especially noticed it where the copper amalgam has been used to patch an alloy amalgam filling, or where it has been in contact with one, the two amalgams not having been inserted at the same time. If the two amalgams are inserted in a cavity at the same time, the alloy amalgam will not harden. This has been questioned. It requires but a single experiment to settle the matter beyond all cavil.

In conclusion, I consider copper amalgam judiciously used a valuable addition to our list of tooth-filling materials. For the masticating surfaces of children's first teeth, cavities difficult of access, or where on any account a very plastic material is desired, it has decided advantages. I have found it useful to cover the masticating surfaces of badly pitted newly erupted first molars ; it enters into and takes firm hold of the little crevices, so that with little or no excavating the surface may be protected until the tooth is matured. It is also valuable as a capping in deep cavities where the pulp is nearly exposed ; it may be used in such case in so plastic a condition that practically no pressure is required to adapt it to place ; it is non-irritant, and becomes in a few days sufficiently hard to protect the tender spots from undue pressure when the filling is inserted. In many places and for many uses it has decided advantages. It does not, however, supplant the alloy amalgams. I am disposed to think that in the long run those who use it most cautiously will appreciate it most highly.

Discussion.

Dr. Chupein said that his experience with copper amalgam tallied very much with Dr. Trueman's. He found that when it presented an inky blackness with a distinct line of demarkation around the filling, with a smooth, glassy, polished surface, it was at its best, and in such cases he had never discovered any discoloration of the tooth-bone. He regarded it as one of the most reliable preservatives of tooth-tissue that we have. He had had cases of discoloration of tooth-substance in its use, but this was not invariable. For teeth which we wish to preserve as long as possible, for cases where it is impossible to apply the rubber-dam, and for teeth far back in the mouth, in inaccessible localities, or on distal surfaces, he regarded it a boon to the operator and the patient. He had observed that copper amalgam sometimes "cupped," as if subjected to attrition, in a manner we frequently observe in gutta-percha fillings, but was at a loss to account for it from a mechanical stand-point, since the material gets so hard. Its blackness in the mouth was not general, as it sometimes remained of a grayish color, but he did not like this grayish appearance as much as the smooth, polished, well-defined blackness. He had *once* used it as a foundation for a filling, and then he found it, as well as the other amalgam which he had used over it, so granular that he removed the whole filling and refilled with copper amalgam alone. He had never observed the greenish stain to the tooth-substance spoken of by Dr. Trueman. In difficult localities he had used it very soft; in this condition it was easier to manage, yet from the length of time it took to set there was danger of its being dislodged from the cavity, especially if it was not supported on all sides by tooth-structure. Its excessive softness did not seem to interfere with its getting excessively hard when it *did* set. It may be made to set differently by the manner of heating it. When first heated, very small globules of mercury will appear all over the surface of the pellet; if the heat is continued, the globules will increase in size, and if the heat is still kept up, the globules will swell and coalesce with each other accompanied with a slight frying sound. If used when the heat is continued thus far, the amalgam will take quite a long time to set, even though considerable mercury be squeezed out of the pellet. To obtain its quick-setting properties it should be ground quickly and vigorously *when the globules are first observed.* If thus used, it will set within ten or fifteen minutes. He does not use as much of it now as formerly, but holds it still in high esteem as a tooth-preserver.

Dr. Chupein had used an amalgam recently made by Dr. Trueman from a new formula. He considered this a "*ne plus ultra.*" It mixed smooth, got quite hard, set quickly, and retained its color admirably.

By request, Dr. Trueman gave his formula, which is as follows: Pure silver 100 parts, copper 5 parts, pure gold 3 parts, zinc 10 parts, and tin 150 parts. The silver, gold, and copper were first melted and the zinc then added. A few moments afterward the tin (previously melted in another crucible) was poured in, the alloy stirred with an iron rod, and immediately poured into an ingot mold.

Dr. Adams asked if Dr. Trueman did not remelt it after casting into the ingot, so as to get the metals thoroughly incorporated?

Dr. Trueman said he did not; he felt sure that by remelting the relative proportions of the metals, by oxidation of the more fusible ones, would be materially changed. He was not, however, impressed that exactness of formula was as important as some writers contend. He had not so found it, and the known fact that there are on the market a large number of different alloys, made from widely different formulas, each being used in practically the same manner, and, judging from their large sale, each giving satisfactory results to a large number of operators, seemed to disprove it. He had arrived at the formula given in the following manner: Finding that an alloy of pure silver and tin contracted, while an alloy of coin silver and tin expanded, he used half of each, or added to the pure silver one-twentieth part of copper. The zinc he added to reduce the melting-point of the less fusible metals so that they would not chill when the tin was added. The gold caused it to set more rapidly. The small amount given seemed to be all that was useful; a larger portion reduced the hardness and the edge-strength of the amalgam. The thorough amalgamation of the alloy he thought of great importance if it is desired that the filling shall retain its color, and this can only be accomplished by using an excess of mercury, to be afterward removed or squeezed out before the amalgam is inserted in the cavity. To favor this he reduced the alloy to fine shavings by a scraping-tool in the turning-lathe in preference to filings.

The subject was then passed.

Dr. Bonsall spoke of the preservative effects of gutta-percha, and thought no material could equal it in the labio-cervical cavities of incisors, and on the buccal surfaces of molars, and the approximal surfaces, where it is not exposed to attrition, especially in the teeth of young patients. He had abandoned the boiler for softening the gutta-percha, and felt sure that he obtained better results by his present method. He used almost exclusively the S. S. White premium gutta-percha. This he cut into small pieces and with a heated instrument picked them up and carried them into the cavity, partially packing it into place ; he then applied hot air by means of the hot-air syringe to still further soften the material, while with a heated instrument he thoroughly packed it into all parts of the cavity, finishing the condensing of the filling with cold instruments ; on this he laid particular stress. By thus chilling the surface he thought he was able to pack it much more solidly, and obtain a harder and better-wearing filling.

Dr. Trueman spoke of the use of the oil of cajuput when filling with gutta-percha. He said the suggestion was given him by Dr. Roop. The merest film of the oil was used in the cavity and the gutta-percha pressed in. The oil slightly dissolved the gum and made it adhere to the walls of the cavity. He had used this oil freely when filling roots, employing a cone of gutta-percha with which to fill the root-canal. He had also used it when inserting pivot teeth with gutta-percha. For filling roots he uses the oil *freely*, for pivoting teeth *moderately*, and for filling cavities with gutta-percha, *very sparingly*.

Dr. Chupein also bore testimony to the preservative effects of gutta-percha, and asked if bridging with gutta-percha from one tooth to another was practiced? He had frequently done it, and had never seen any ill effects from it. He had in this way preserved cavities and roots from further decay until he or his patient had more time to give to crowning of the roots and to more permanent operations.

Dr. Trueman had often practiced this bridging of spaces with gutta-percha. At the close of the season, when he was pressed for time, he frequently did this, and could recall many cases in which teeth were preserved by such treatment, even when no preparation of the cavities had been attempted, and this crude procedure had sufficed for three or four years.

Dr. Bonsall spoke of the value of Williams's crystalloid gold in starting fillings. He regarded it very highly for this purpose.

Dr. Chupein had used it for this purpose and liked it very much. He had never made a filling entirely of it, but had used it only to start the filling. It packed without the least recoil, seemed to accommodate itself readily to the smallest undercuts, did not tip or move, and was as inelastic as lead.

Dr. Bonsall said it seemed to be a thin layer of crystal gold between two sheets of foil. He advised the members to try it.

KANSAS STATE DENTAL ASSOCIATION.

At the nineteenth annual meeting of the Kansas State Dental Association, held at Topeka, April 29 to May 2, 1890, the following officers were elected to serve for the ensuing year: T. K. Aitken, president; F. O. Hetrick, first vice-president; J. A. Roberts, second vice-president; R. A. Wasson, treasurer; C. E. Esterly, secretary; and S. S. Noble, member of the board of censors.

A letter was received from Dr. J. N. Crouse urging every member of the association to join the Dental Protective Association of the United States, and guaranteeing protection for the small sum of ten dollars, which he argued was a trifle that was more than compensated for in the lessening of the annoyances that practitioners would receive were there no organization for defence. He said it was not the design of the association to protect the entire profession, but only its members, and the time was coming when only members would receive its benefits.

The following resolution was adopted:

> *Resolved*, That we thoroughly indorse the Dental Protective Association of the United States, and urge upon every member of the dental profession to join the association, and send to Dr. J. N. Crouse, of Chicago, its president, the initiation fee of ten dollars.

The twentieth annual meeting of the association will be held at Wichita, commencing Thursday, April 30, 1891.

C. E. Esterly, *Secretary*, Lawrence, Kas.

TEXAS DENTAL ASSOCIATION.

The tenth annual meeting of the Texas Dental Association was called to order in the county court room at Belton, May 6, 1890, and continued in session for four days.

The sessions were the most profitable and interesting in the history of the association. The attendance was large; the papers short and practical; the discussions to the point. The clinic covered a wide range of practical dentistry. Every one left the meeting feeling that it was good to have been there.

Waco was selected as the next place of meeting, and the fourth Tuesday in May, 1891, as the time.

The officers for the ensuing year are: J. H. Laseter, president; Pitt. S. Turner, first vice-president; O. B. Love, second vice-president; Chas. B. Lewis, secretary and treasurer; T. L. Westerfield, curator of museum.

Chas. B. Lewis, *Secretary*,
Dallas, Texas.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE Dental Society of the State of New York held its twenty-second annual meeting at Albany, May 14 and 15, 1890.

The following officers were elected for the ensuing year: Wm. Wallace Walker, president; G. L. Curtis, vice-president; H. G. Mirick, treasurer; F. T. Van Woert, secretary; R. Ottolengui, correspondent. The Board of Censors remains as before, except that Dr. E. C. Baxter, of Albany, was elected to fill the place of Dr. French, of Troy, deceased.

W. W. WALKER, *President*,
No. 67 West Ninth street, New York.

CHICAGO DENTAL SOCIETY.

AT the annual meeting of the Chicago Dental Society, held on Tuesday, April 1, 1890, the following officers were elected for the ensuing year: C. N. Johnson, president; C. H. Thayer, first vice-president; I. A. Freeman, second vice-president; A. E. Baldwin, secretary; T. L. Gilmer, corresponding secretary; E. D. Swain, treasurer; A. W. Harlan, librarian; Geo. H. Cushing to succeed himself on the executive committee; C. F. Hartt, E. A. Royce, and S. B. Palmer, Board of Censors.

T. L. GILMER, *Corresponding Secretary*,
3266 Cottage Grove ave., Chicago, Ill.

SOUTHERN DENTAL ASSOCIATION.

THE annual meeting of the Southern Dental Association will be held at Atlanta, Ga., commencing July 15, 1890. Attention is called to the following points:

1. Delegates must purchase *first-class tickets* to place of meeting, and obtain from agent *certificate* of purchase.
2. If through tickets cannot be obtained, buy to convenient point where they can, and then apply notice No. 1, above.
3. Reduced rates will apply only to *through-ticket points* on return.
4. Return tickets (one-third highest unlimited fare) only to those holding *agent's certificate* properly countersigned by D. R. Stubblefield, corresponding secretary.
5. Failure to obtain certificate from any cause will debar reduced rate.
6. No *stop-over privilege* allowed on reduced fare; and certificates good only three days after date of adjournment.

D. R. STUBBLEFIELD, *Corresponding Secretary*,
Nashville, Tenn.

PENNSYLVANIA STATE DENTAL SOCIETY AND EXAMINING BOARD.

The twenty-second annual meeting of the Pennsylvania State Dental Society will be held at Minnequa Springs, Pa., July 29, 30, and 31, 1890.

Special low rates at the Minnequa House have been arranged. Order for tickets at reduced rate from all points over the Pennsylvania Railroad and the Philadelphia & Reading Railroad can be obtained upon application to the corresponding secretary, No. 1331 Arch street, Philadelphia. L. Ashley Faught, *Corresponding Secretary.*

The Pennsylvania State Dental Examining Board will hold its next meeting during the sessions of the State Dental Society, at Minnequa House, Minnequa Springs, Pa., beginning Tuesday, July 29, 1890.

Candidates for examination are requested to be present on the first day of meeting and promptly call on the president or secretary.

W. E. Magill, *President*, Erie, Pa.
J. C. Green, *Secretary*, West Chester, Pa.

WISCONSIN STATE DENTAL SOCIETY.

The twentieth annual meeting of the Wisconsin State Dental Society will be held at Appleton, Wis., July 15 to 17, inclusive, 1890.

A cordial invitation is extended to visiting dentists.

Claude A. Southwell, *Secretary*,
No. 411 National avenue, Milwaukee, Wis.

NORTH CAROLINA STATE BOARD OF DENTAL EXAMINERS.

The North Carolina State Board of Dental Examiners will meet in the city of Wilmington, N. C., at the Orton Hotel, on Tuesday, June 24, 1890, at 10 o'clock A.M.

Dentists who failed to register according to the provisions of the amendments to the dental laws of North Carolina, ratified February 7, 1887, and February 25, 1889, are required by law to procure license from the Examining Board at this meeting.

J. F. Griffith, *Secretary*,
Salisbury, N. C.

INDIANA STATE DENTAL ASSOCIATION.

The thirty-second annual meeting of the Indiana State Dental Association will be held at Lake Maxinkuckee, commencing Tuesday, June 24, 1890, and continuing four days.

The State Board of Dental Examiners will meet at the same time and place. R. W. Van Valzah, *Secretary*,
Terre Haute, Ind.

GEORGIA STATE DENTAL SOCIETY.

THE twenty-second annual meeting of the Georgia State Dental Society will be held at Gainesville, Ga., July 9 to 12, 1890.

The programme is a very elaborate one. The exhibits, clinics, and entertainments will be superior to any heretofore given by the society. Hotel rates, $1.25 to $2.00 per day. Georgia railroad rates are one full fare going and one-third fare returning,—*provided* one hundred or more in attendance paid full fare going.

L. D. CARPENTER, *Corresponding Secretary*,
Atlanta, Ga.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

THE Massachusetts Board of Registration in Dentistry hold their next meeting for examination of candidates in Boston, June 30, 1890.

E. V. McLEOD, *Secretary*,
New Bedford, Mass.

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DENTAL COLLEGE COMMENCEMENTS.

UNIVERSITY DENTAL COLLEGE.

THE first annual graduating exercises of the University Dental College (Dental Department of the Northwestern University) were held, in connection with those of the medical department, at Central Music Hall, Chicago, Ill., on Tuesday, April 29, 1890, at 2.30 P.M.

The address to the graduates was delivered by Prof. Edmund Andrews, M.D., LL.D.

The number of matriculates for the session was twenty-five.

The degree of D.D.S. was conferred on the following graduates by Prof. N. S. Davis, M.D., LL.D., in the absence of the president, Joseph Cummings, D.D., LL.D. :

NAME.	STATE.	NAME.	STATE.
Isaac A. Freeman	Illinois.	Lucius E. Richardson	Ohio.
Samuel H. Hunt	Illinois.	Charles W. Richardson	Wisconsin.
Arthur E. Matteson	Illinois.	William O. Vallette	Illinois.
William B. McCord	Illinois.	William C. Wise	Illinois.
John B. Palmer	Maine.	Sylvester M. Wilkie	Illinois.

UNIVERSITY OF PENNSYLVANIA—DEPARTMENT OF DENTISTRY.

THE eleventh annual commencement of the Department of Dentistry of the University of Pennsylvania was held, in connection with that of the medical department, at the American Academy of Music, Philadelphia, Pa., on Thursday, May 1, 1890, at 12 o'clock M.

The valedictory address was delivered by J. William White, M.D., professor of clinical surgery.

The number of matriculates for the session was one hundred and fifty-nine.

The degree of D.D.S. was conferred on the following graduates by William Pepper, M.D., LL.D., provost of the university:

NAME.	STATE OR COUNTRY.
Hinrich Addicks	Germany.
William E. Barnard	Maryland.
Ira C. Bowman	Pennsylvania.
Frank S. Burket	Pennsylvania.
Wilhelm Chemlin	Germany.
Frederick G. Clement	Pennsylvania.
Alfred J. Cohn	Wisconsin.
James D. Compton	Pennsylvania.
Henrique S. do Couto	Brazil.
J. Ernest Crothers	Ohio.
Kirk A. Davenport	New York.
William S. Davenport	New York.
William W. DeHaven	Pennsylvania.
Justino S. Dilk	Brazil.
Carl Doebbelin	Germany.
Johann Otto Drossel	Switzerland.
William C. Dunn	Pennsylvania.
Owen J. Eagan	Massachusetts.
Charles A. Emerson	Ohio.
Delbert D. Fair	Illinois.
Clement de Faye	Switzerland.
Edward de Faye	Switzerland.
George L. Fenn	Connecticut.
A. Kay Finlayson	Scotland.
Aloysius Flotzinger	Pennsylvania.
Stewart Freeman	Nova Scotia.
Arthur T. French	Florida.
Edwin A. Geilfuss	Wisconsin.
John Girdwood	Scotland.
Edwin D. Graves	Pennsylvania.
J. A. Jacob Haupt	Pennsylvania.
Karl Heitmüller	Germany.
Sabourin Holly	Hayti.
L. Stanford Hyatt	Pennsylvania.
G. Edward Hyndman	Canada.
Harvey N. Jackson	Wisconsin.
George I. Keener	West Virginia.
Thomas B. P. Knight	Pennsylvania.
George C. Küsel	Pennsylvania.
James G. Lane	Pennsylvania.
Frank J. Lankester	England.
Norman W. Leard	Prince Ed. Isl.
William W. Leech	Pennsylvania.
Moritz Lohoff	Germany.
Rafael M. Lombard	Cuba.
John G. Ludwick	Pennsylvania.
Frank M. McCartney	Pennsylvania.
Harry D. Matten	Pennsylvania.
David A. Norton	Wisconsin.
Patrick J. O'Hara	Pennsylvania.
George S. Proctor	Pennsylvania.
Abe L. Pugh	Pennsylvania.
Herbert D. Requa	New York.
Edwin L. Romig	Pennsylvania.
Santiago Sacaza	Nicaragua.
Lawson S. Shennan	Scotland.
Charles L. Snyder	Illinois.
Walter A. Spencer	Pennsylvania.
Frederick W. Stevens	Nova Scotia.
Howard T. Stewart	Mississippi.
Horace B. Story	Ohio.
Will H. Trout	Pennsylvania.
Francis P. Valiente	Cuba.
Herbert D. Whitmarsh	New York.
G. Frank Williams	Connecticut.
Linneaus B. Wood	Massachusetts.

DEGREE CONFERRED JUNE 5, 1889.

NAME.	STATE OR COUNTRY.
Samuel S. Lowry	Pennsylvania.
Domingos P. Ribas	Brazil.
Jesus Ruiz	U. S. of Colombia.
Frederick Sauers	Pennsylvania.

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EDITORIAL.

THE TRANSMISSION OF ACQUIRED CHARACTERS.

THE possibility of animals and plants transmitting acquired characters to their descendants is a question which has excited much interest in the popular mind from time immemorial, and has also received frequent attention at the hands of biologists. A vast number of alleged facts have been recorded in which claim is made of the occurrence of such phenomena,—*i.e.*, modifications of structure produced by disease, accident, or surgical procedure having been transmitted. These claims, however, are frequently based on hearsay evidence, and, when admitted as facts, may be accounted for as coincidences. It must be admitted that acquired characters are not generally transmitted; that as a rule nature fails to reproduce modifications acquired in the lifetime of the progenitor or antecedent; and a favorite argument as to the persistence of type and in opposition to the theory that acquired modifications are transmissible is that male Jews after thousands of years of circumcision of their ancestors are still born with the average length of prepuce.

The London *Lancet* in a recent issue discusses the subject editorially, citing Darwin, Godrou, and Weismann in opposition to the idea of the transmission of acquired anomalies. There are still, however, many who contend that such transmission actually occurs, and among them some whose opinion is entitled to great weight. The subject is one of much interest, and, as the *Lancet* observes, well-marked and well-authenticated instances of such inheritance should be recorded, and every opportunity to collect data which may assist in forming a conclusive answer should be availed of.

Dr. Harrison Allen, whose contributions to medical literature have so frequently had special value in their relation to subjects in which dentists are concerned, suggests that no better field exists for gleaning facts bearing on the problem under notice than that of the human form, and especially in the parts thereof relating to the act of mastication. As is known to the zoölogist, the parts involved in this act are very important in the classification of the mammalia, the slightest departure in the form, number, position, and rate of development of the teeth being rigidly correlated with other variations in the economy, while the shapes of the lower jaw and of those portions of the skull which afford surfaces for attachment of the masticatory muscles are also of marked importance. No structures of the body resemble the teeth in the character of their response to morbid impressions; no other organs are arranged in progressive series; nor are there any other organs than the teeth which are evolved after birth. Hence the effects of disease and accidents to which the teeth are subjected are sure to be recorded in the shapes of the crowns and roots. The study of acquired characters may therefore be hopefully essayed in this group of structures.

If the student of heredity and of acquired characters were to have placed at his disposal a collection of the casts of the teeth of the permanent set of three generations,—that is to say, of the parent of the subject, the subject himself, and the children of the subject,—and a clinical history secured of the diseases and accidents which the persons had incurred, a tenable argument might be established as to the significances of the contrasts or resemblances in the forms of the teeth in this subject.

Thus, if three generations were expressed by the letters A, B, C, and B were the subject of an acquired character (let us say from scarlet fever or measles), the new form of structure seen in the second and third molars may be transmitted to C. But in order to prove this to be the case it is necessary to know of the peculiarities of these teeth in A. Hence the teeth of the ancestors and descendants of the person who exhibits the acquired character must be known.

We would be glad to receive such casts and records, and Dr. Allen, with his habit of intelligent observation, would be pleased to give most careful study to all specimens and histories furnished, and to present the results through the Cosmos to the profession.

It should be remembered that the germs of the temporary teeth are in position at about the tenth week of fetal life, and that at birth the forms of the crowns have been fully developed, and the roots partially formed; that the germs of the permanent teeth are recognizable as early as the fourth month of fetal life, and that at birth the germs of twenty-four of the permanent set are in various stages of development. The germs of the second or twelfth-year molars do not, however, make their appearance until three months after birth, and those of the third molars not until the child is about three years of age, while the process of calcification of the twelfth-year molars does not commence until the child is three years of age, and that of the third molars not till about the twelfth year. It is therefore in these eight posterior teeth that acquired characters can be most readily observed. They offer, however, an interesting field for observation, and especially is the third molar of interest in this connection because it is developed from the second molar. If, therefore, as the result of accident or disease the development of the second molar is interfered with, and in consequence an abnormality of the third molar is produced, and such abnormality is reproduced in a child of the subject, we would have a clear case of the transmission of an acquired character.

It would seem that where the sphere of observation and comparison is limited, as in the practice of dentistry, rare opportunity is afforded for that minute and accurate observation which should result in a quick appreciation of phenomena whose records would show deeper meanings and more subtle relations than appear on the surface. It is in this limitation that is to be found the explanation, justification, and necessity of specialties; and as such limitation demands keener appreciation of the histology, physiology, and pathology of the organs and tissues concerned, so it alike demands of those who thus in the very nature of things must obtain special insight that they contribute the results of this concentration of observation and thought for the general good.

TENTH INTERNATIONAL MEDICAL CONGRESS.

In our March issue we gave the main facts relating to the Dental Section of the congress to be held in Berlin, August 4, ensuing.

A cordial invitation is given to all dental graduates from reputable universities or colleges to attend the congress, and those who have any paper or anything of interest to present are desired to send an abstract of the paper, or a description of the device or appliance, to Prof. Dr. W. D. Miller, West Vossstrasse 32, Berlin, Germany, or to Dr. R. R. Andrews, honorary secretary of Section XIV, Diseases of the Teeth, at Cambridge, Mass.

The congress will without doubt prove of practical interest to all attending dentists ; and as the time is close at hand, we subjoin information relating to transportation from New York, and refer those who may contemplate attendance to the honorary presidents, Drs. W. C. Barrett, Buffalo, N. Y. ; J. Taft, Cincinnati, O. ; E. S. Talbot, Chicago, Ill., and H. J. McKellops, St. Louis, Mo., for further information.

The Hamburg-American Packet Company has made the following special rates for physicians and dentists attending the congress :

Express service, steamers "Columbia," July 17, and "Augusta-Victoria," July 24. Outward, $75 and $100 ; round-trip, $150 and $200. Prior sailings, round-trip, $180 and $225.

Regular service, steamer "Wieland," July 19. Outward, $45, $54, $67.50 ; round-trip, $90, $103.50, $126, in rooms for four, three, or two, respectively. Prior sailings, round-trip, $93.50, $106.25, $127.50, in rooms for four, three, or two.

For passage and further particulars, apply to C. B. Richard & Co., general passenger agents, 61 Broadway, New York, or 96 La Salle street, Chicago, Ill.

THE ANNUAL MEETINGS.

The American Dental Association will hold its next annual meeting at Excelsior Springs (near Kansas City), Mo., commencing on Tuesday, August 5, 1890.

The Southern Dental Association meets at Atlanta, Ga., on Tuesday, July 15, 1890.

We hope to be furnished with programme of details of each of these important meetings for our July issue. Meantime, it is sincerely to be hoped that chairmen of sections and of committees are diligently employed in completing arrangements so full of promise as to command a full attendance at each of the men best qualified to instruct and of those most needing the benefit of instruction. Given the attendance of these two classes, and the meetings cannot fail to be both interesting and profitable.

BIBLIOGRAPHICAL.

TRANSACTIONS OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA. Third series. Vol. xi. Philadelphia: Printed for the College, 1889.

This volume of the transactions of the College of Physicians of Philadelphia contains the papers read before the college from January to December, inclusive, 1889, with discussions, etc. Several of the papers are illustrated with wood-cuts, plates, and charts. The usual lists of officers, committees, fellows, etc., precede the addresses and papers. A special feature is the binding in at the end of the William F. Jenks prize essay on the "Diagnosis and Treatment of Extra-uterine Pregnancy," by John Strahan, M.D., M.Ch., M.A.O., of Belfast, Ireland. This prize was awarded by the college January 20, 1889.

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OBITUARY.

DR. JAMES WEST.

DIED, at New Orleans, La., April 24, 1890, after a protracted illness, Dr. JAMES WEST, in the sixty-ninth year of his age.

Dr. West was born in Liverpool, England, in 1822; was left an orphan at an early age, and apprenticed to a jeweler and silversmith for seven years. He went from Liverpool to Birmingham, and from thence sailed for New York. Going to St. Louis upon his arrival in this country, he opened a small jewelry and repairing store in that city, and in a short time gained considerable reputation for his great skill. He soon made the acquaintance of Dr. Clark, a leading dentist of St. Louis, and was induced to begin the study of dentistry. He shortly after went to New Orleans, where, after accumulating some money from his business as a jeweler, he continued the study of dentistry, and soon opened a practice of that profession which he actively pursued for forty-five years. He was both proficient and popular, and accumulated a considerable fortune. He excelled in gold work.

Dr. West leaves a widow and four sons, two of the latter, Drs. J. W. and Walter O. West, following their father's profession of dentistry in New Orleans.

DR. JOSEPH C. BARNUM.

DIED, at the residence of his father, in Monticello, N. Y., April 18, 1890, of Bright's disease, JOSEPH CLOWES BARNUM, D.D.S., in the forty-third year of his age.

Deceased was the son of George W. and Caroline G. Barnum, and a brother of the late Sanford C. Barnum, D.D.S., so well known to the profession as the inventor of the "rubber-dam." He never married, and of his immediate relatives his father alone survives him.

Dr. Barnum graduated from the Pennsylvania College of Dental Surgery in 1871, and began the practice of his profession at Monticello in the same year; afterward practiced in Brooklyn, N. Y., for two years, but returned to Monticello in 1877, and continued practicing there until his death. He was a man of unusual mental abilities, and was very thorough and successful in the practice of dentistry.

D. E. R.

DR. WILLIAM A. CLYMER.

DIED, at Atlantic City, N. J., April 24, 1890, WM. A. CLYMER, D.D.S., at the age of thirty-three years.

Dr. Clymer was a graduate of the Philadelphia Dental College, and at the time of his death was demonstrator in that institution, which position he occupied for some time with ability and integrity. The faculty, recognizing his worth, feels deeply the loss the school, the profession, and friends have sustained in his untimely death.

H. I. DORR.

DR. L. B. WELCH.

DIED, at Wilmington, Ohio, April 18, 1890, of paralysis of the heart, Dr. L. B. WELCH, in the sixty-eighth year of his age.

Dr. Welch was born at Scipio, Tompkins county, N. Y., November 8, 1822. He studied medicine at Cleveland Medical College, but practiced that profession only a short time. He commenced the practice of dentistry in 1845; settled at Wilmington in 1849, where he was in practice at the time of his decease. The degree of D.D.S. was conferred on him in 1872.

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DENTAL LEGISLATION.

DENTAL LAW OF NEW JERSEY.

FOLLOWING we present the text of the law entitled "An Act to regulate the practice of dentistry in the State of New Jersey," which was signed by the governor April 7, 1890, and is now in force:

1. *Be it enacted by the Senate and General Assembly of the State of New Jersey*, That a board or commission to be known as the State Board of Registration and Examination in Dentistry is hereby created, to consist of five resident and practicing dentists, whose duty it shall be to carry out and enforce the provisions of this act; the present members of the board of dental examiners appointed and now existing under the act of the legislature of this State entitled "An act to regulate the practice of dentistry and to

protect the people against empiricism in relation thereto in the State of New Jersey,'' approved anno domini one thousand eight hundred and seventy-three, shall constitute the first members of said board or commission, and shall hold office until the first Tuesday in October next, and until their successors are appointed, as hereinafter provided ; the New Jersey State Dental Society shall, at its next annual meeting, recommend to the governor five dentists of good repute residing and practicing in this State, whom the governor shall appoint members of said board or commission to fill the vacancies occurring on the first Tuesday in October next, as hereinbefore provided ; the members of said board or commission shall be appointed for the term of five years and until their successors are duly appointed, except that of the members thereof first to be appointed upon recommendation of said society ; one shall hold office until the first Tuesday in October next ; one until the first Tuesday in October, anno domini one thousand eight hundred and ninety-one ; one until the first Tuesday in October, anno domini one thousand eight hundred and ninety-two ; one until the first Tuesday in October, anno domini one thousand eight hundred and ninety-three, and one until the first Tuesday in October, anno domini one thousand eight hundred and ninety-four ; and the members so first appointed as aforesaid shall immediately, upon their appointment, determine by lot the period for which each member shall hold office ; it shall be the duty of the New Jersey State Dental Society, at each annual meeting after the next, to recommend to the governor a dentist in good repute, residing and practicing in this State, whom the governor shall appoint to fill the vacancy in the said board occurring in the year in which such meeting is held ; vacancies occurring in the term of any member or members shall be filled for the unexpired term or terms only, in the same manner, upon recommendation to be made by said society ; the governor may remove any member of said board for good cause shown, upon recommendation of the New Jersey State Dental Society.

2. *And be it enacted*, That immediately after the passage of this act the present members of the "board of examiners" shall meet and organize as the State Board of Registration and Examination in Dentistry, under this act, by the election from their number of a president and secretary, who shall severally hold office until the first Tuesday in October next, and until their successors are elected ; the board shall annually elect from its number a president and secretary, who shall have the power, during their term of office, to administer oaths and take affidavits, certifying thereto, under their hands and the seal of said board ; said board shall hold at least two meetings in each year, for the purpose of examining and licensing persons to practice dentistry in this State ; three of said board shall constitute a quorum, and its proceedings shall, at all reasonable times, be open to public inspection ; said board shall make an annual report of its proceedings to the governor on or before the thirty-first day of December, in each year ; the board shall adopt rules for its own government, and rules for the examination and licensing of practitioners of dentistry in this State ; the examination of applicants for license to practice shall be confined to written or oral examination, or both written and oral, upon subjects properly relating to the science of dentistry, and a knowledge of which is necessary to the proper and skillful practice of said science ; the said board may also require from applicants as part of the examination, demonstrations of their skill in operative and mechanical dentistry ; and any rule altering the nature of the examination and increasing

the severity thereof, or the subjects to be included therein, shall not be enforced at any examination held within six months after its adoption and public promulgation ; said board shall have the power to determine the good standing and repute of any college or colleges, and may, from time to time, designate in some public manner colleges whose diplomas will be received by it ; the said board shall announce in the leading dental journals, from time to time, its regular stated times for holding examinations ; it shall also cause to be published, at least once in such journals, the rules and amendments thereto adopted for the examination and licensing of practitioners, and the mode and terms of application for examining and license, which shall, in all cases, be reasonable and fair ; said board shall adopt a common seal, and may sue or be sued, and in all actions brought by or against it, it shall be made a party under the name of the State Board of Registration and Examination in Dentistry.

3. *And be it enacted*, That it shall be the duty of every person lawfully practicing, or entitled to practice dentistry in this State at the time of the passage of this act, to apply to said board, before the first day of January, anno domini one thousand eight hundred and ninety-one, to cause his name, residence, and place of business to be registered in a book to be kept for that purpose by the secretary of said board ; and the said board shall issue to each person registered by it a certificate under its seal and the hand of its president and secretary, setting forth that such person was, at the time of the passage of this act, lawfully entitled, by the laws of this State, to practice dentistry and is duly registered ; the said board, for good cause shown, may register and issue its certificate thereof, to any person applying therefor after said first day of January, anno domini one thousand eight hundred and ninety-one, provided it shall appear to the satisfaction of said board that the person so applying was lawfully practicing or entitled to practice dentistry at the time of the passage of this act, and that the refusal to issue such certificate will work hardship to said person so applying ; the said board may demand from any person applying for registration and certificate, proof of his right to the same under this act, and may refuse to grant registration and certificate thereof to any person not lawfully entitled thereto.

4. *And be it enacted*, That any person aggrieved by such action of said board may apply within sixty days after such refusal by said board to the supreme court of this State for its writ of mandamus to compel said board to register and issue its certificate to him ; and in case any justice of said court shall issue or allow on such application an order on said board to show cause, no suit for the collection of any penalty for violation of this act shall be instituted against such person until the final hearing and determination of such application.

5. *And be it enacted*, That any person who may desire to begin the practice of dentistry in this State after the passage of this act shall file his name, together with an application for examination, in the form provided for by the rules of said board, with the secretary of said board, and at the time of making such application shall pay to the secretary of said board a fee of twenty-five dollars, and shall present himself for examination at the first regular meeting of the board thereafter held for examination and licensing of practitioners in dentistry, due notice of which meeting shall be given him ; the examination fee shall in no case be refunded, but should any applicant, from sickness or other good cause appearing to the satisfaction of the board, fail to attend such examination, or should any person appearing, fail to pass

successfully the examination, such person so failing to appear or failing to pass shall be admitted to any subsequent examination or examinations without the payment of further or other fee ; every applicant for examination shall, with his application, submit to the said board, as a prerequisite to examination, a diploma of graduation from a dental college recognized by said board as in good standing and repute, and proof, if the board shall so require, that the same was regularly issued and conferred upon the holder in due course ; or, if not a graduate of a dental college, a certificate under oath from a reputable and duly authorized dentist that he has studied with and under such dentist as a student for not less than five years continuously ; all persons successfully passing such examination shall be registered as licensed dentists, in a book to be kept by the secretary of the board for that purpose, and shall receive from said board a certificate under the seal of said board and the hand of its president and secretary, that the person named therein is lawfully authorized and licensed to practice dentistry in this State ; such certificate, lawfully and regularly issued, shall be evidence in any of the courts of this State of the right of the person named therein to practice dentistry in this State.

6. *And be it enacted*, That from and after the passage of this act any person desiring to study dentistry in this State with any duly authorized dentist, for the purpose of presenting himself for examination and license as a practitioner of dentistry in this State at the expiration of his term of study, shall cause his name and residence and the name and residence of his preceptor to be registered with said board, and his term of study shall commence and date only from such registration ; any person so registered as a student may perform mechanical work in the office of his preceptor, but no student shall perform any operation upon the mouth or jaw of any person, save in the presence and under the supervision of his preceptor, under penalty of revocation of his registration as a student and such further penalty as is hereinafter provided for unlawful practice of dentistry in this State.

7. *And be it enacted*, That it shall be unlawful for any person not now by the laws of this State authorized, hereafter to practice dentistry in this State save after examination and license by the said State Board of Registration and Examination in Dentistry, and no person shall be examined by said board for license unless he is, at the time of such examination, the graduate of and the holder of a diploma of graduation from a dental college recognized as in good repute by said board, or shall have studied with a reputable dentist for five years continuously preceding his application for examination.

8. *And be it enacted*, That out of the funds coming into the possession of said board shall be paid the expenses of said board incurred in carrying out the provisions of this act, and mileage to each member, at the rate of five cents per mile for all distance necessarily traveled in discharge of his duties ; no part of the mileage or other expenses of the board shall ever be paid out of the State treasury ; all moneys received shall be held by the secretary of the board, and paid out only upon resolution of the board and warrant of its president, and the secretary shall give bond in such sum as the board shall, from time to time, direct, with good and sufficient surety, to be approved by the board ; and the said board shall, in its annual report to be made to the governor, submit a statement of all moneys received and disbursed by it during the period covered by said report.

9. *And be it enacted*, That any person, not now lawfully practicing or entitled to practice dentistry by the laws of this State, who shall practice

dentistry in this State after the passage of this act without having first obtained from said Board of Registration and Examination in Dentistry a certificate of license to practice in accordance with the provisions of this act, shall forfeit and pay the sum of three hundred dollars for each and every offense ; any person now lawfully practicing or entitled to practice dentistry under the laws of this State, who shall, after the first day of January, anno domini one thousand eight hundred and ninety-one, practice dentistry in this State without having first obtained from said Board of Registration and Examination in Dentistry a certificate of registration, in accordance with the provisions of this act, shall forfeit and pay the sum of fifty dollars for each and every offense ; any person who shall knowingly or falsely, and with the intent to deceive the public, claim or pretend to have or hold a certificate of registration or of license granted by said board, or who shall falsely, and with the intent to deceive said board, claim or pretend to be a graduate or the holder of a diploma of graduation from any dental college, not being such graduate or rightfully holding or entitled to such diploma, shall forfeit and pay the sum of three hundred dollars ; any person to whom a certificate of registration or of license shall be issued under the provisions of this act, and who shall practice dentistry under a false name, with intent to deceive the public, shall be liable to have such certificate revoked, upon twenty days' notice of such proposed revocation, and of the time and place of considering such revocation, by order of the said board ; and any person who, after such revocation of his certificate, shall continue to practice dentistry in this State, shall forfeit and pay the sum of three hundred dollars ; a certificate of registration or of license granted to a person under one name shall not be pleaded as a defense to an action brought against him for practicing without a certificate under another name ; each and every separate act of dentistry performed by any person, in violation of any of the provisions of this act, shall be deemed and taken to be a distinct and separate offense ; this act shall not be construed to prevent any person from extracting teeth, nor to apply to any surgical operation performed by any regular licensed physician or surgeon.

10. *And be it enacted*, That the penalties imposed and the sums to be forfeited in and by the preceding section of this act shall be sued for and recovered, with costs of suit, in an action of debt, to be brought by the Board of Registration and Examination in Dentistry before any judge of any city district court in or court of common pleas of the county wherein such offense shall have been committed, or in any county wherein such offender may reside ; one-half of such penalty or forfeit money shall be for the use of the State Board of Registration and Examination in Dentistry, and one-half shall be paid into the treasury of the State for the use thereof; and in case the defendant shall fail or neglect to pay the amount recovered against him, with costs, the judge or court before whom judgment has been obtained shall issue his process against the body of the defendant, and cause him to be committed to the jail of the county in which the judgment is obtained until the judgment and costs are paid ; the imprisonment, however, shall not exceed four calendar months from the date of such commitment.

11. *And be it enacted*, That the act of the legislature of this State entitled "An act to regulate the practice of dentistry and to protect the people against empiricism in relation thereto in the State of New Jersey," approved March the fourteenth, anno domini one thousand eight hundred and seventy-three, the supplement thereto approved February seventeenth, anno domini one

thousand eight hundred and eighty, and the supplement thereto approved March the twenty-seventh, anno domini one thousand eight hundred and eighty-four, and all acts and parts of acts inconsistent herewith, be and the same hereby are repealed.

12. *And be it enacted,* That this act shall take effect immediately.

PERISCOPE.

Treatment of Mucous Patches.—In the treatment of mucous patches in the mouth in secondary syphilis Professor Gross advised, first :—Dry with absorbent cotton and apply a four per cent. solution of cocaine ; then apply the following with camel's-hair pencil :

℞—Hydrargyri nitratis (acid.), part i ;
Aquæ destillat., part xii. M.
Sig.—Apply once daily.

Between applications use the following :

℞—Acid. pyroligneosi, f ʒ i ;
Aquæ destillat., f ℥ viii. M.
Sig.—Use as a mouth-wash.

—*College and Clinical Record.*

Treatment of Tuberculous Ulcers of the Tongue.—

℞—Lactic acid,	80 parts ;	
Water,	20 "	M.

The affected parts to be touched several times daily with a camel's-hair brush previously immersed in this solution.—*Revue de Thérapeutique.*

A Dental Anesthetic.—The combination of cocaine and antipyrine in solution is said to act as a powerful local anesthetic upon the gums, and also upon sensitive dentine. The anesthesia is more lasting and more complete than when cocaine is used singly.

Dr. Martin, in *L' Union Médicale,* suggests the following formula, which he has used with great success :

℞—Hydrochlorate of cocaine, gr. ¾ ;
Antipyrine, gr. vj ;
Distilled water, ♏ xvj. M.

—*Medical News.*

Aphthous Stomatitis—

℞—Salicylate of soda,	20 parts ;
Distilled water,	100 "

Dissolve.

In cases of aphthous stomatitis the inflamed parts should be painted with the above solution five or six times during the day, particularly after meals. The mouth should previously be well rinsed out with tepid water.—*L' Union Médicale.*

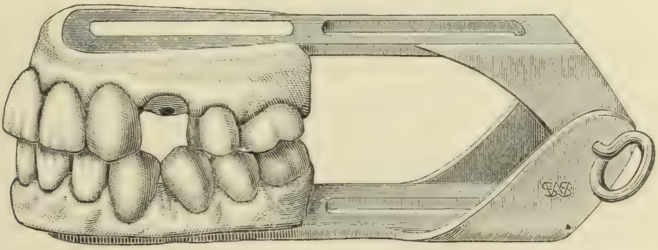
Incompatible Antiseptics.—The *Journal de Médecine* directs attention to the following incompatibilities : corrosive sublimate and iodine ; corrosive sublimate and soap ; soap and iodine ; carbolic acid and iodine ; carbolic acid and permanganate of potassium ; salicylic acid and soap ; salicylic acid and permanganate of potassium ; permanganate of potassium and oils, soap, or glycerine.—*The Sanitarian.*

TO CORRECT AN OFFENSIVE BREATH.—An offensive odor of the breath due to bad teeth or other causes may be overcome, or at least greatly abated, by the habitual use of listerine. Add a teaspoonful to a tumblerful of water for a mouth-wash and gargle, and if a little is swallowed so much the better. Indeed, a bad breath is not unfrequently caused by the gaseous eructations of indigestion, and for this also listerine is an excellent remedy, in doses of twenty to thirty drops in a little water.—*The Sanitarian.*

TREATMENT OF RICKETS.—The treatment of rickets should be by food rather than by drugs. Raw meat is of more value than iron, and cream or fresh milk than cod-liver oil. The diet must be carefully examined to see that it contains a due proportion of fat, proteids, and salts. A sufficiently close estimate is easily made, since the composition of milk and of all foods used for children is accurately known. The amount of animal fat in a rickety child's food must equal at least one-fourth of the total solids taken ; proteids and carbohydrates about one-third, and salts about one-tenth. Such a diet will cure rickets without drugs. Iron is often a useful adjunct. The salts of lime may be added in the form of lactophosphate. Potent aids are sunlight, fresh air, and warm clothing.—*The Lancet.*

HINTS AND QUERIES.

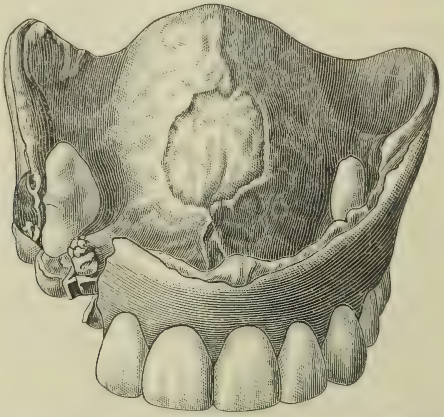
CROWN ARTICULATOR.—For small pieces of bridge-work and single crowns I have found a small metal articulator like the model sent you very useful. It is also available for the making of inlays on Dr. Stoddard's plan ; in fact, for the accurate adjustment and adaptation of any small denture or part of one, the simple device in the neat form you have given it, and for which I am told Dr. W. B. Knox is in some degree responsible, will prove to be of real practical value.



Incidentally, I may add that I find the little Parker-Stoddard furnace indispensable for continuous-gum work, in the baking of which I use a test piece made of eight parts pure gold and one part of platinum filings fused by means of the Knapp blow-pipe. The little globule is flattened quite thin with a hammer and placed on the slab near the palatal border of the plate, so that it can be seen through the hole in the dome of the furnace.

So soon as the test is seen to round up on its edges, the case will be found fused to a nicety. By increasing or decreasing the proportion of platinum, the test can be made to indicate the fusing-point of any of the formulas for body or enamel with a certainty that will enable even a novice to produce uniformly good results.—P. G. C. HUNT, M.D., D.D.S., Indianapolis, Ind.

Reprehensible Bridge-Work.—In October, 1889, a gentleman desired me to remove from his mouth a vulcanite plate. I asked him if he could not do it himself, and he replied that he could not, as it had been in his mouth over *three years* and he had tried repeatedly to remove it without success. He then gave me the following history: Four years ago he was in the West, and while there had this denture made. He was unable to keep the plate in position, and finally told his dentist that he must do something for him, as he was going East again and did not want any more trouble with the plate. The dentist said he would make them stay up all right, and took the plate, spread some material (the patient did not know what it was) over it, put it in the patient's mouth, and directed him to bite hard. Then he told him not to touch the plate for a few days, and he would find it had plenty of suction. The gentleman did as directed, and did not try to remove his plate until he came to this city some ten days afterward, and then of course could not get it out. It remained there until his health began to fail, and his physician told him he must have it taken out. I examined his mouth, which was in a most disgusting condition. The artificial denture was a full one, excepting the natural second bicuspids, which came through circular openings made in the plate for that purpose. The gum-tissue was very much inflamed, and bled at the slightest touch, and had grown down over the rim of the plate so as to almost completely cover it. By using some force I could slightly move the plate, but noticed that the natural bicuspids moved with it.



In removing it, I first broke away the artificial cuspid and bicuspid on the right of the plate, and with a napkin pressed up the gum-tissue at this point, and with the engine burred away the vulcanite rim underneath it. I then seized the plate with a pair of straight-beak forceps, and with a gentle but firm motion worked it loose, and drew it out, the natural bicuspids and the mucous membrane of the roof of the mouth coming away with it. It was then made plain why the patient had been unable to remove the plate himself. The dentist had placed a great mass of pink gutta-percha on the plate, and had literally cemented the plate in the patient's mouth, using the natural bicuspids as anchorages.

During the operation the patient became very sick, and was sick for a few days following, but he soon recovered his former health. The illustration makes evident the nature and extent of this most reprehensible experiment in bridge-work.—W. R. Sutch.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

STUDIES ON THE ANATOMY AND PATHOLOGY OF THE TUSKS OF THE ELEPHANT.

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(Continued from page 429.)

ABNORMAL AND PATHOLOGICAL CONDITIONS IN THE TUSKS OF ELEPHANTS.

WE have seen that the pulp of an elephant's tusk is an organ of enormous size when compared with the pulp of a human tooth, and that it sits upon a wide, open base, instead of being contracted to a mere thread everywhere surrounded by unyielding walls. These facts make it possible for pathological processes in the elephant's tusk to assume a character essentially different from that of similar processes in the human tooth. As a rule, diseases of the pulp of the human tooth spread rapidly from one portion of it to another, the tendency to become total being in fact very pronounced in most inflammatory processes of this organ. In the pulp of the elephant's tusk, on the other hand, diseases of a most severe nature, leading to the formation of abscesses from the size of a pea to that of a goose-egg, or even larger, usually retain an entirely local nature, the remaining parts of the pulp, often even in the immediate neighborhood of the abscess, carrying on their normal functions undisturbed.

These differences may, I think, be accounted for on the ground that the large size, conical shape, and wide, open base of the pulp of the elephant's tusk produce a body readily yielding to the pressure arising from inflammation at any point, while in the pulp of the human tooth all release from pressure, except through artificial means, is out of the question. Again, it is highly probable that the mechanism of resorption performs an important part in preventing the accumulation of the products of disease in the former, while in the latter its action is practically zero.

We are accordingly enabled to study, in the tusks of elephants, processes which do not occur in human teeth, or at most in so slight a degree as to render their investigation a subject of great difficulty. In particular, however, it is hoped that such investigations may throw light upon some disputed questions in the pathology of the human teeth.

A. Anomalies of Size and Shape.

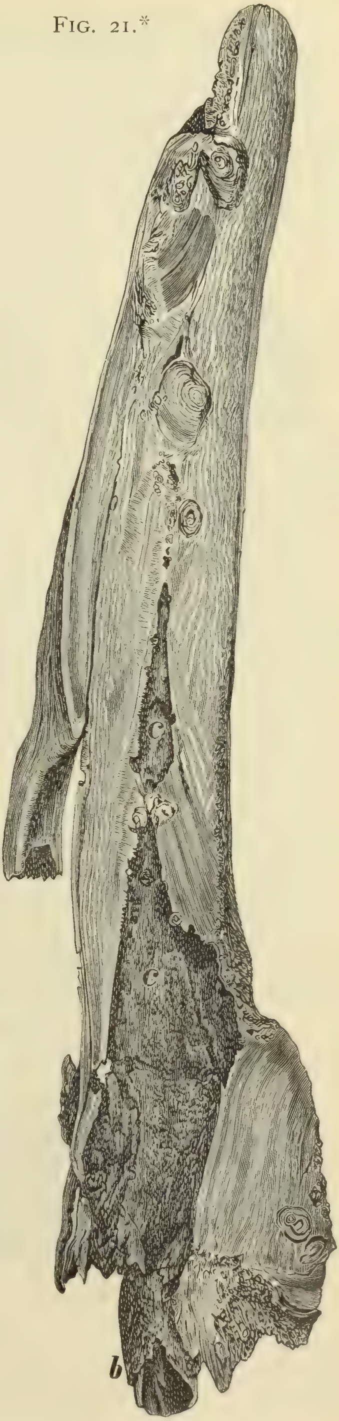
It is a well-known fact that the tusks of the elephant are put to most violent usage. A rough estimate of the violence of the blows or strains to which they are subjected may be formed from the fact that fractured tusks two to four inches in diameter may be found in the market, while elephants in confinement not unfrequently break off their tusks in a fit of rage. It is readily conceivable that in all such cases the tusk must be severely wrenched in its socket, and that the pulp may suffer injuries of so severe a nature as to bring about a serious disturbance in its further development.

I have in my possession a tusk which was broken off one and a quarter feet beyond the alveolar border, at a point where the pulp was about one inch in diameter. A portion of the pulp, eight inches long, was thrown off, while the remaining portion made an attempt to shut itself off from the outer world by imposing a wall of ivory, and had nearly succeeded at the time of the death of the animal. The injury to the alveolar portion of the pulp was, however, so great that the only increase in the length of the tooth which occurred was an irregular strip of ivory, two and three-quarters inches wide and eight inches long, bearing no resemblance whatever to the alveolar portion of a tusk, and lined only on one side with cement. I am inclined to believe that the great majority, if, indeed, we may not say all of the malformed tusks met with, owe their malformation to injuries received while the tooth was very young.

We naturally find all grades of deformity, from those which deviate but slightly from the normal to those which appear simply as an unshapen mass of bone-like substance, bearing scarcely any resemblance whatever to the tusk of an elephant. Some are short and thick, with a more or less rough, uneven, or lobular surface ; others are long and slender, strongly curved or spirally twisted. Frequently, too, openings are seen on the surface leading to cavities in the interior. The pulp-chamber is small and distorted, or may be completely wanting, having been filled out with osteo-dentine. These tusks show on cross or longitudinal sections a most varied intermixture of different structures, in part perfectly normal, mostly, however, a conglomerate of vaso-, osteo-, and tubulo-dentine.

One of these tusks which recently came into my possession (Fig. 21) is doubly interesting from the fact that on one side a portion of the pulp became separated from the main body and went on forming a perfect little branch tusk, with pulp-chamber, dentine, and cement, comparatively free from signs of disease.

FIG. 21.*



We are able to study with great ease the process of gemination, or, more properly expressed, branching in this tusk. A fold of the pericementum dips into the pulp, thereby separating a portion of it from the main body. This fold gradually extends around the portion thus separated, so as to completely envelop it. Whether this fold of pericementum in dipping into the pulp carries a layer of odontoblasts along with it, or whether the odontoblasts are subsequently formed, could be determined only by a most laborious study of microscopic sections of the tusk. Suffice it to say that a perfect tooth organ is formed producing normal cement and ivory (Fig. 22). Strangely enough, the main body of the tusk remains at first without cementum on the side joining the bud, and only gradually again acquires its normal layer of cementum.

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*FIG. 21.—Longitudinal section of a malformed tusk of an elephant, showing an adventitious or branch tusk at *a*, and the end of a second branch tusk at *b*. ⅓ nat. size.

This same tusk shows also on the opposite side, not visible in the figure, a second adventitious tusk which is free at the apex for a length of about three inches. It then meets together with the main body of the tusk, to become separated again at the base (Fig. 21 *b*), where it possesses its own pulp-chamber and cementum.

An instance of "twin formation" of the left tusk of an elephant is described by A. Friedlowsky. It is composed of two tusks of unequal size, the larger of which is wound around the smaller in the form of a long spiral. The anterior segments of both roots and the greater portion of the bodies are fused together, but the apices are separate. (Wedl, "Pathology of the Teeth," Amer. ed., p. 171.) The museum of the Dental Institute (Berlin) also possesses a case in which twin tusks of equal size are united only at the apices. I am inclined to believe that many cases described as twin formations are not due to the development of two separate germs, but to the splitting up of one germ, as is beyond all doubt the mode of formation of the branch tusks represented in Fig. 21.

FIG. 22.

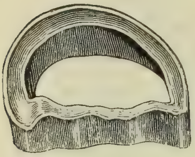

FIG. 22.—Cross-section of the branch tusk *a* in Fig. 21, showing the pulp-chamber, dentine, and cement. Nat. size.

B. ANOMALIES OF STRUCTURE.

The abnormal conditions of structure observed on the tusks of elephants may be conveniently considered under four groups:

1. Anomalies of structure without any apparent lesion and without break in continuity.
2. Structural peculiarities resulting from wounds or fractures.
3. Abscess-cavities.
4. New formation of the pulp.

1. *Anomalies of Structure without any apparent Lesion and without Break of Continuity.*

These anomalies are of varied character and not uncommon occurrence. They mostly belong to the class known by ivory-dealers as tripy ivory (Fig. 23). The ivory has a mottled or speckled appearance, and is almost worthless for purposes of manufacture. The walls of a pulp-chamber of a tripy tusk will usually be found to be studded with minute pyramidal formations, about 2–5 mm. in height (Fig. 23),

FIG. 23.

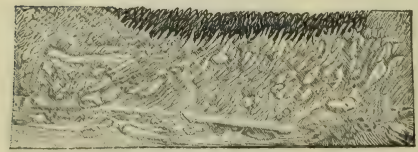

FIG. 23.—Tripy ivory.

consisting of osteo-dentine, often containing typical bone-lacunæ and varying numbers of tubules, sometimes regular, sometimes exceedingly irregular. The spaces between the pyramids are subsequently filled out with irregular, pigmented, bony matter, small portions of pulp-tissue often becoming encapsuled, and in ground sections appearing as black, irregular spaces. The completely formed tissue accordingly presents a most varied mixture of tubular, vaso-, and osteo-dentine, and besides contains numerous irregular spaces, which may be classed neither under tubuli, lacunæ, nor vascular canals.

In other cases a more or less marked departure from the normal structure is the occurrence of vascular canals, sometimes regularly, sometimes irregularly distributed throughout the mass of the ivory. An extended study of ivory reveals a large number of anomalies of this class, but I cannot undertake to consider them all here, though I may refer to them more in detail in the chapter on the *Histo-pathology* of ivory.

2. *Structural Peculiarities resulting from Wounds or Fractures.*

It is a well-known fact, and one which has been the subject of much discussion for more than a century, that musket-balls have been frequently found imbedded in solid ivory, the track of the ball being sometimes open, sometimes filled up with modified ivory, and sometimes not a trace of the course taken by the ball to reach its present position being visible.

Haller[*] attempted to explain these facts by the supposition that ivory possesses the power of secreting a bony juice, out of which new dentine may be deposited, and that in this way any loss of substance (wound, etc.) may be repaired: "*hoc in casu ex succo osseo novæ laminæ sunt subnatæ.*"

Blumenbach[†] appears also to incline to this view, although it is not possible to gather from his communication a clear idea of his interpretation of the phenomena under consideration.

Goethe[‡] describes a collection of thirteen preparations of pathological ivory, of which at least seven contained iron or leaden balls. He speaks of stagnation and coagulation in the bony mass surrounding the ball, evidently attributing destructive and reparative properties to the ivory itself, though the language of the text is anything but clear.

Of recent writers on this subject, Heitzmann and Bödecker[§] have unreservedly testified their adherence to this view. They say, "The present writers have had no chance to study an elephant's tusk immediately after its injury, but the illustrations as given by Karl Wedl are sufficient for the assertion that all the changes in the ivory are produced by an inflammatory reaction around the foreign body driven into it. The result in this instance is exactly the same as in human dentine in an inflamed condition caused by foreign bodies."

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[*] "Elementa physiologiæ," pars. sec. pp. 51–55. 1767.

[†] "Vergleichende Anatomie," p. 44. 1804. 3 Auflage, 1824.

[‡] "Sämmtliche Werke," 32 Band, Morphologie, p. 239. Betrachtungen über eine Sammlung Krankhaften Elfenbeins.

[§] "Inflammation of Dentine," *Independent Practitioner*, p. 122. 1886.

All these authors, with the exception of Goethe, had very little material for investigation, and based their conclusion chiefly, or, as in case of the latter two named, altogether upon theoretical speculations. On the other side a great number of distinguished scientists and odontologists have unanimously expressed the opinion, based upon actual study, that the phenomena referred to result from the action of the pulp and pericementum alone, and that the ivory itself takes no part whatever in the work of repair.

Peter Camper[*] writes, "*Les corps metalliques dont il est question doivent avoir pénétré à travers les alvéoles dans l'extrémité cave des défenses.*" (The metallic bodies in question must have penetrated the pulp-chamber of the tusk through the alveolus.) There, according to Camper, they remain imbedded in the pulp until, by the natural process of deposition of ivory by the pulp, that portion of the tusk becomes solidified and the ball is then found imbedded in solid ivory. At the same time the whole tusk "grows," so that the ball is carried beyond the margin of the alveolus. Camper's view has been supported by Cuvier,[†] Rousseau,[‡] Owen,[§] Goodsir,[||] Murie,[¶] Spence Bate,[**] Wedl,[††] Tomes,[‡‡] Sudduth,[§§] Fletcher,[||||] Busch,[¶¶] and many others.

Owen has rightly remarked that the presence of foreign bodies in solid ivory has long since ceased to be a cause of wonder. Nevertheless, the results obtained by a study of a much larger material than has heretofore been at the disposition of any writer may not be without interest; all the more, as the attempt has recently been made to establish theories of dental diseases on the ground of analogy with assumed inflammatory processes in ivory.

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[*] "Description anatomique d'un Éléphant mâle," p. 54. 1802.

[†] "Annales du Muséum," T. viii, pp. 114, 115. 1806.

[‡] "Anatomie comparée du système dentaire chez l'homme et chez les principaux animaux." Paris, 1839.

[§] "Odontography," p. 643. 1840–45.

[||] *Transactions of the Edinburgh Philosophical Society*, p. 93. 1841.

[¶] *Odont. Soc. Transactions*, 1870, p. 281.

[**] "On the Treatment of the Inflamed Dental Pulp." *Transactions of the Odontological Society of Great Britain*, 1861–63, p. 338.

[††] "Pathologie der Zähne," 1872.

[‡‡] "Dental Anatomy," 1882, p. 352.

[§§] DENTAL COSMOS, 1887, p. 258.

[||||] *Transactions of the International Medical Congress, Washington*, 1886. Reprint.

[¶¶] *Verhandlungen der deutschen odontologischen Gesellschaft.* Band I, Heft 1 und 4.

It can scarcely be said, on the whole, that foreign bodies are frequently met with in the tusks of elephants; nevertheless, in the course of time, a considerable number of such cases have been found and described. Ruysch,* Haller,† Goethe,† Camper,† Blumenbach,† Cuvier,† Goodsir,† Wedl,† Busch,† and others have described some sixty different cases, while I personally have had the opportunity of examining no less than fifty-five cases of musket-balls *in situ*, sixteen cases in which the ball had struck the tusk and glanced off, and three cases of spear-points imbedded in the outer portion of tusks,—in all, seventy-four different cases. Twenty-one of these preparations are in my own possession, thirteen may be found in the collection of the Dental Institute of the University of Berlin; the others I was enabled to examine through the kindness of various ivory-dealers and private persons, in whose possession they were found. Some of the latter have since gone into the possession of the Dental Institute, and have been described by Busch in the *Verhandlungen der deutschen odontologischen Gesellschaft*, Bd. I, Heft 1 u. 4.

In passing to the study of these various specimens, let us bear in mind the facts referred to in detail above, that the tusk of the elephant possesses a persistent growth, that the thickness of the wall of the tooth within the alveolus varies from a fraction of a millimeter to the radius of the tooth, that every foreign body penetrating the pulp (except in the way explained below under 7) must pass through the skin, the alveolus, and the wall of the tooth, and, lastly, that the pulp of an elephant's tusk is an organ of great size, with a broad base, capable of suffering severe wounds and extensive suppurative processes without losing its vitality,—in fact, an organ in no way to be compared with the one we are accustomed to deal with in the human tooth. Bearing these points well in mind, we shall not find it difficult to account for all the phenomena presented by the preparations under consideration.

When the tusk of an elephant is struck by a musket-ball or a spear-point, various results may be brought about, depending upon whether the ball strikes the free or the alveolar part of the tooth, and whether the pulp is wounded or not.

1. *The ball strikes the free portion of the tooth and glances off* without reaching the pulp, making a hole in the dentine 0.5 to 1 cm. deep.

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* "Opera omnia," T. iv. Thesaurus anat. dec., p. 76. Pennant, "History of Quadrupeds," p. 152.

† Op. cit.

Cases of this kind may be frequently met with. I have seen sixteen, and ivory-dealers inform me that they are not at all rare. Such wounds never show any tendency to heal; the surface, however, becomes smoothed off in the course of time by friction.*

2. *The ball or spear-point strikes the tooth outside of the alveolus and remains fixed, without, however, penetrating to the pulp.* In this case also the wound does not close, nor does it show the least tendency to do so. Specimens of this class are very rare, since balls which strike the tooth outside the alveolus apparently nearly always glance off, as would naturally be expected. I have seen but two such preparations, and Goethe describes one which was in his collection. Even he, with his notions of stagnation, coagulation, etc., was forced to the conclusion that a tooth wounded upon its surface was not exposed to any injury other than the simple loss of substance.

I have also three specimens in which spear-points had been driven about three-quarters of an inch into the tusk, and then broken off, without wounding the pulp. Sections of two of these specimens are seen in Figs. 24 and 25. In Fig. 24 a layer about 4 mm. thick, split off by the force of the blow, has not been restored, nor is any change whatever to be seen in the nature of the ivory around the spear-point in either of the preparations. Sections under the microscope show no trace of histological changes, particularly no trace of that unfailing formation in all cases of diseased ivory, osteo-dentine.

FIG. 24.

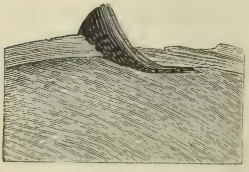

FIG. 24.—A cross-section from the outer portion of a tusk with a spear-point *in situ*.

FIG. 25.

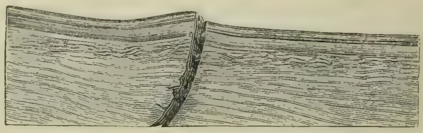

FIG. 25.—Longitudinal section from the outer portion of a tusk pierced by a spear-point.

I have observed also a number of cases of fracture, breakage, and of extensive wearing-away of the tusk, all of which show not a trace of reaction or change of any kind in the ivory, unless either the pulp or the pericementum is involved. This fact also was noted by Goethe. The lesson taught by these cases is so plain that he who runs may read. We see clearly enough that *when neither the pulp nor the pericementum is implicated, no process of repair or reaction of any kind takes place.*

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* I have never seen a case where it could be shown beyond doubt that a ball striking the free portion of a tooth penetrated to the pulp, the thickness of the wall of the tooth in this part being apparently too great to be overcome, even if the ball should strike the tooth perpendicular to its surface, which it would most probably very seldom do. Two experiments which I caused to be made point to the conclusion that a musket-ball cannot penetrate dry ivory to a depth of over three-quarters of an inch. Two experiments are, however, too few to be conclusive, and the expense accompanying such experiments was found to be too great to carry them on further.

FIG. 26.

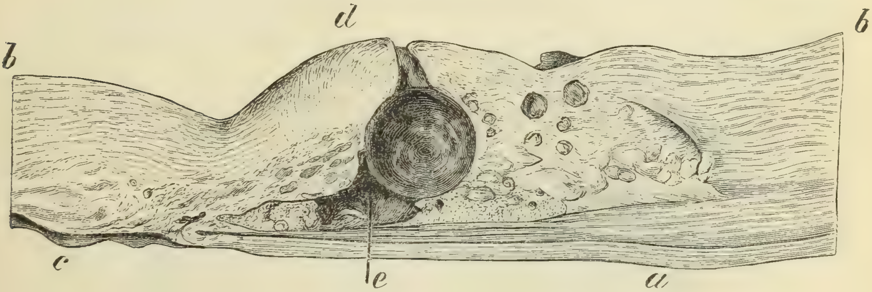

FIG. 26.—Iron ball imbedded in the wall of a tusk. *a*, cement; *b*, *b*, wall bordering on the pulp; *c*, entrance of ball; *d*, mass of dentine built up over the ball; *e*, small abscess-cavity.

FIG. 27.

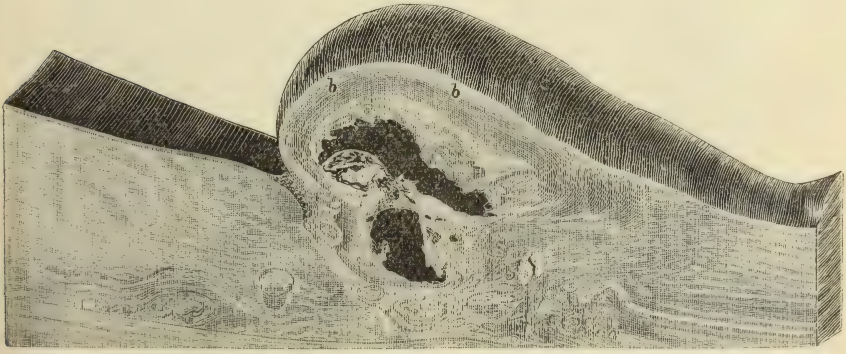

FIG. 27.—Longitudinal section from the wall of a tusk with the fragment of a leaden ball *in situ*. *a*, entrance of ball; *b*, *b*, wall of ivory by which the pulp has freed itself from the ball.

3. *The ball having passed through the alveolus penetrates the wall of the tooth, reaching the surface of the pulp without, however, escaping from the tooth-wall.* The wound in the tusk is closed from without with cement, while the pulp coats the surface of the ball with a layer of modified ivory, more or less irregular in structure, depending upon the amount of irritation to which the pulp has been subjected. Having thus protected itself from the irritating agent, it deposits from that time on ivory of a nearly or quite normal structure. Cases of this class are represented in Figs. 26–28. In Fig. 26 an iron ball

passed through the thin wall diagonally at *c*, remaining lodged in its present position ; the wound is closed from without by cementum, while the pulp has inclosed the ball in osteo-dentine (except at *e*, where a small abscess seems to have formed), and was at last engaged in rapidly piling up ivory at *d*, to completely separate itself from the ball. In Fig. 27 a leaden ball penetrates the tusk at *a*, and remains lodged in the wall, becoming itself completely torn out of shape by the resistance of the ivory. Here, again, the microscopical examination shows the wound to be closed from without by cement ; the fragments of lead are most perfectly enveloped in osteo-dentine by the pulp, which, having completely protected itself, is now depositing regular ivory at *b b*.

FIG. 28.

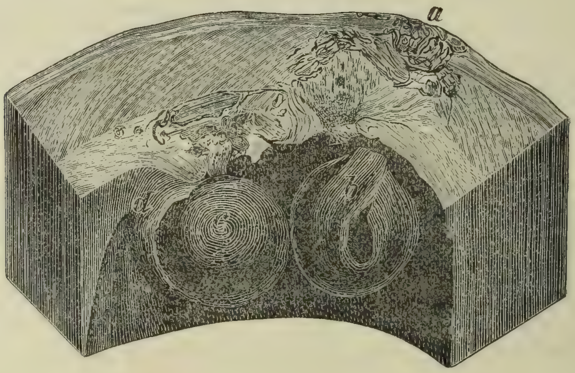

FIG. 28.—Part of a section of a tusk with two iron balls *in situ*. *a*, entrance of balls ; *d*, wall of irregular dentine being thrown up over ball *c*.

Fig. 28 represents the very interesting case in which two iron balls are found lying side by side. I have seen in all four cases of this kind, but the one here illustrated is the only one showing the entrance and course of the balls. We must suppose that in such cases both balls were propelled together from the same barrel. In the present case, one of them, *b*, was evidently made by bending or hammering a nail together.

Having broken through the wall of the tooth at *a*, they remained adhering to the inner surface, and the pulp had at the time the tusk was taken already begun, at *d*, to build up a wall around the ball *c*, which in course of time would have completely encapsuled it or brought it into the solid dentine. In this case, again, the outer portion of the track is filled in with cement, the inner portion with more or less modified dentine.

4. *The ball passes through the wall of the tooth and lodges in the substance of the pulp.* The opening in the wall is closed by a forma-

tion of cement, in which we occasionally find an intermingling of dentine. The ball becomes encapsuled first by a layer of osteo-dentine of varying thickness, afterward with regular ivory. Cases of this category are illustrated in Figs. 29–31. In Fig. 29 a very small iron ball breaks through the wall of the tusk at the point *a*, driving fragments of the hard tissue into the pulp. Its force being, however, spent in passing through the skin, alveolus, and tooth-wall, it penetrates but a short distance into the pulp, where, in the course of time, it becomes imbedded in osteo-dentine, with which the track of the ball is completely filled up, except at the outermost part, which is filled out with cement. A careful examination of the preparation shows that the wall, at the time of the wound, could not have been over one-third of an inch thick.

FIG. 29.

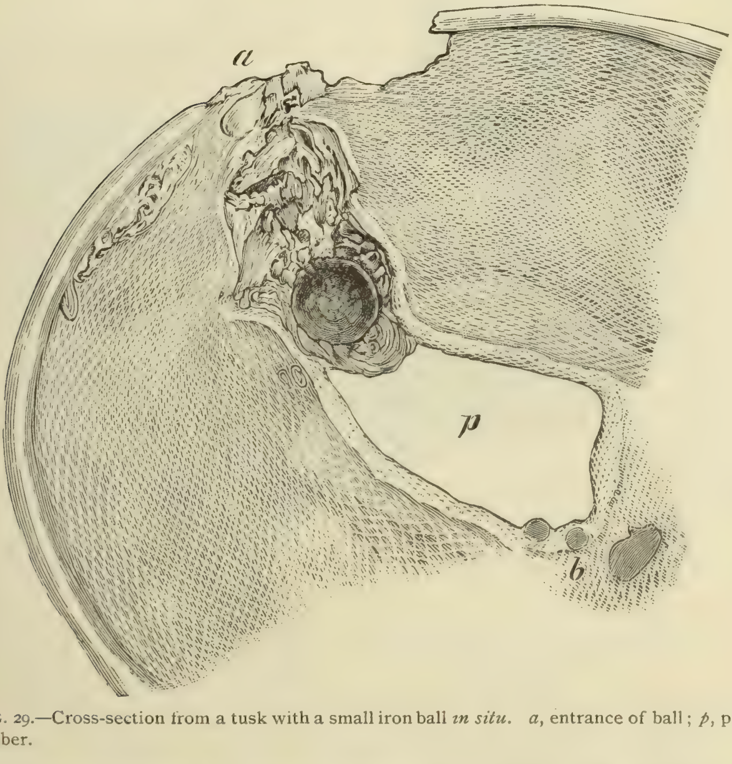

FIG. 29.—Cross-section from a tusk with a small iron ball *in situ*. *a*, entrance of ball; *p*, pulp-chamber.

A longitudinal section of a beautiful preparation of this class is illustrated in Fig. 30. An iron ball breaks through the wall of the tooth at *a*, where it is a little over three-eighths of an inch thick. The exact thickness may be seen at *b*. Fragments of the broken wall are forced into the pulp, while the ball penetrates three inches into the pulp before coming to rest, where it becomes surrounded by an irregular, flattened mass of osteo-dentine, nearly filling up the whole pulp-chamber at that point.

The fragments of the primitive wall become imbedded in osteo-dentine, while the wound is healed from without by a deposit of cementum. The new formation in which the ball is imbedded is two and a half inches long, two inches broad, and one and a quarter inch thick. It was found in the pulp-chamber of a tusk about eight feet in length, and showed nothing on the outside indicating the presence of a ball. Only my curiosity to see how the specimen looked inside led to the discovery of its contents. I then carefully followed the career of the tusk till it came into the hands of the turner, when I succeeded in securing the portion showing the entrance of the ball, as seen in Fig. 30.

FIG. 30.

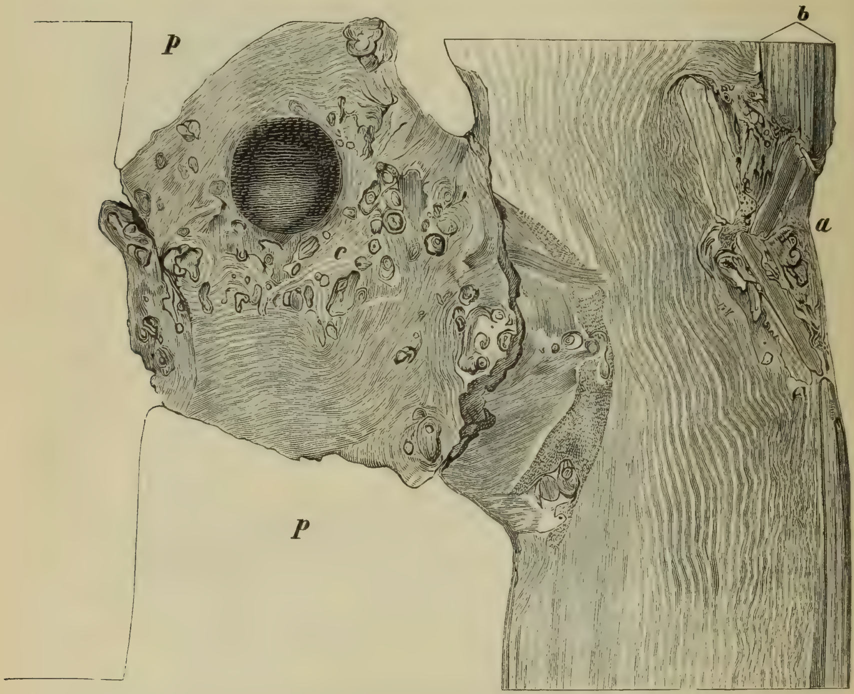

FIG. 30.—Part of a longitudinal section from an elephant's tusk. *p*, pulp-chamber: *b*, primitive tooth-wall; *a*, entrance of ball; *c*, mass of irregular dentine formed around the ball, extending quite across the pulp-chamber.

An equally striking specimen of this class, in which the process of encapsulation took a somewhat different course and reached a more advanced stage, is illustrated in Fig. 31. Here again we have no difficulty in determining the thickness of the walls of the tusk at the time the wound was inflicted. The ball penetrated the base of the tusk at a time when the wall was but little over half an inch thick (*d*, *d'*). The fracture of the wall at *a*, *a'* is very plainly discernible. The ball breaking through the wall *d* penetrated the pulp to a point three and a half inches below the surface *c*, strewing the fragments (*b*) along its track.

In the course of time the wound was imperfectly healed from without by a deposit from the pericementum. The fragments (*b*) and the ball (*e*) became inclosed in osteo-dentine, and finally by the natural process of growth of the tooth the remaining portion of the pulp-chamber was filled up with tolerably regular ivory (*i*).

FIG. 31.

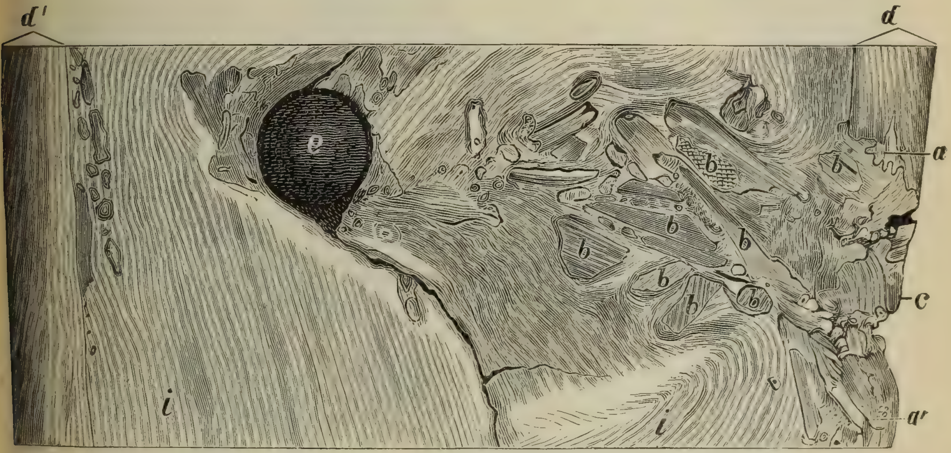

FIG. 31.—Longitudinal section from an elephant's tusk, showing an iron ball imbedded. *c*, entrance of ball; *d*, *d'*, primitive tusk wall; *a*, *a'*, fractured ends of the primitive wall; *b*, splinters of ivory driven into the pulp now imbedded in osteo-dentine; *e*, ball; *i*, normal ivory.

In all of the preceding cases the external wound has healed; completely in Figs. 27–31, incompletely in Fig. 26. In Fig. 32 we have a case in which the suppuration produced was so severe and so long continued as to prevent the wound being healed by either pulp or pericementum. The ball in this case was of very large size, and appears to have inflicted an unusually severe wound. It is not possible to tell exactly how thick the wall of the tusk was at the time the wound was received. It could not, however, have been over an inch thick, since the splinter of regular ivory (*e*) could never have been forced into its present position unless at that time this portion of the tooth was still pulp.

The pericementum made an attempt to close the wound, and succeeded in reducing its diameter at one point to about one-third that of the ball, so that before the preparation was sawn open it served as a natural ivory rattle-box. The pulp also finally succeeded in putting a layer of very irregular osseous substance (*c*) between itself and the ball.

FIG. 32.

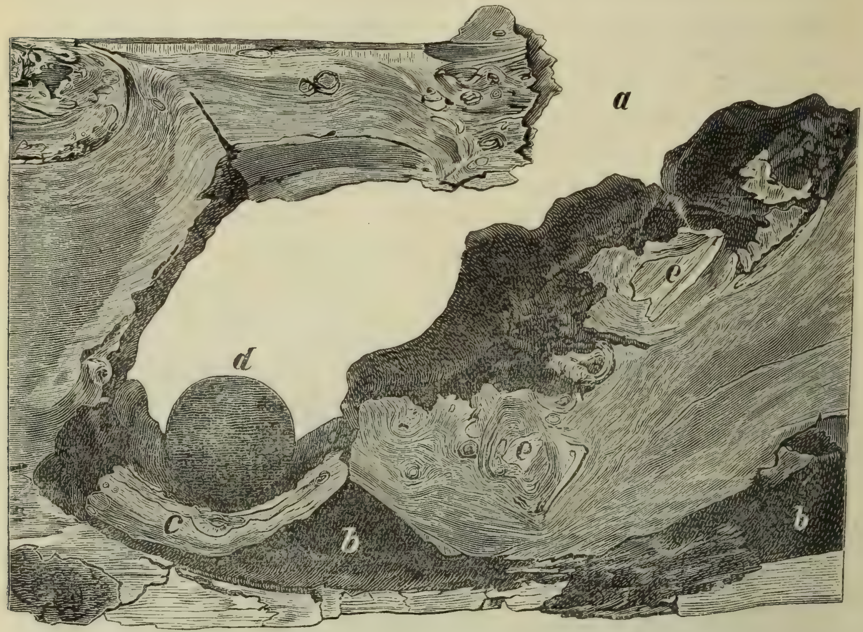

FIG. 32.—Longitudinal section from a tusk containing a large cavern resulting from a gunshot wound. *a*, entrance of ball; *b*, *b*, remains of pulp-chamber; *c*, thin layer of a conglomerate bone-like substance by which the pulp finally succeeded in separating itself from the cavern; *d*, ball found in the cavern; *e*, splinters from the primitive wall of the tusk.

FIG. 33.

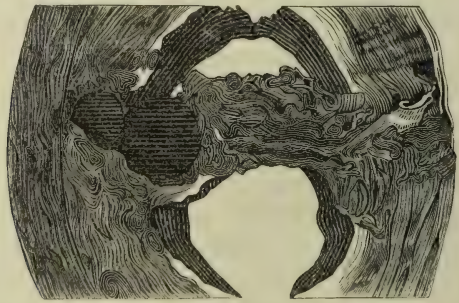

FIG. 33.—Two leaden balls pierce the wall of the tusk, traverse the pulp, and lodge in the opposite wall. The track of the balls through the pulp becomes ossified. (After Wedl.)

5. *The ball passes through the alveolus, the wall of the tooth, and the pulp, imbedding itself in or being arrested by the opposite wall.* In this case, again, both the pericementum and the pulp take part in the healing process; the former closing the wound externally, the latter internally.

Sometimes the track of the ball through the pulp becomes completely ossified, as is the case in a specimen illustrated by Wedl, and which, with his permission, I have reproduced in Fig. 33.

A somewhat noteworthy case of this category I have illustrated in Fig. 34. In this case the animal must have lived many years after receiving the wound. The point of entrance of the ball may be readily found at *a*, and, judging from the thickness of the splinters (*b*), the wall could not have been half an inch thick at the time. The ball passing quite through the thin wall traversed the whole thickness of the pulp, and was then arrested by the opposite wall. In the course of time the whole pulp-chamber at this part of the tusk became filled up with ivory, which will be seen to have a very irregular structure, owing to the serious disturbance produced by the passage and presence of the iron ball.

FIG. 34.

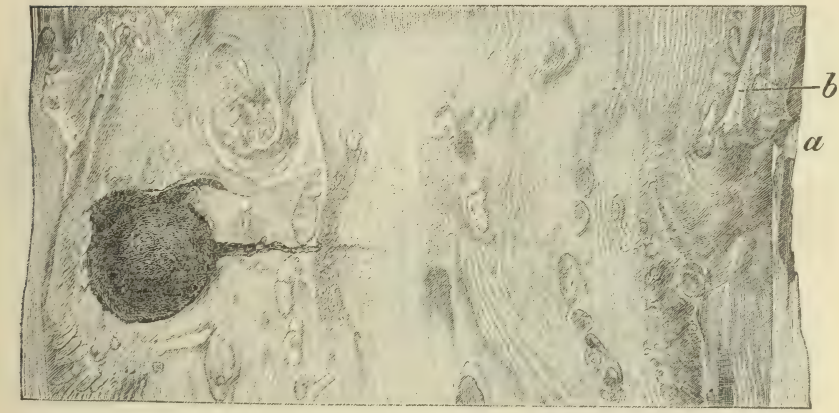

FIG. 34.—Longitudinal section from a tusk with ball *in situ*. *a*, entrance of ball; *b*, splinters of ivory then driven into the pulp, now imbedded in osteo-dentine.

A case is now and then to be met with in which the encapsuled ball is united to the wall of the pulp-chamber by a narrow neck of ivory. By some the ivory is supposed simply to grow from the wall around the ball, thereby inclosing it; others suppose that the ball first becomes encapsuled and afterward unites with the tooth-wall, a point which might be determined by proper sections under the microscope. To me the former explanation seems the more probable. In Fig. 28

a wall is in process of formation around the ball *c*. The mass inclosing the ball may grow to the size of a hen's egg or larger, and sometimes sends out numbers of stalactitic processes in a direction parallel with the long axis of the tusk.

FIG. 35.

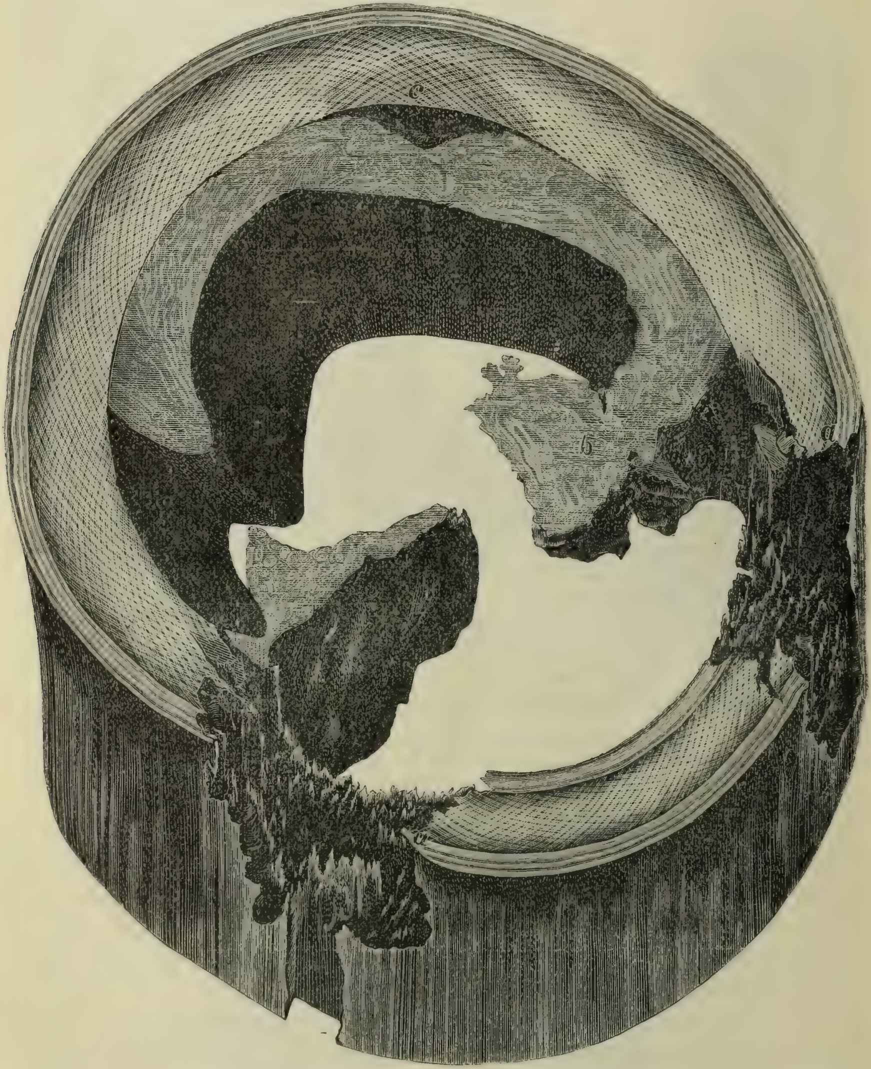

FIG. 35.—Cross-section from the alveolar portion of a tusk pierced by an iron ball, showing the wall of normal ivory formed previous to and the pathological ivory formed subsequent to the wound.

6. *The ball passes completely through the base of the tooth and escapes at the opposite side.* I possess but two cases of this kind, shown in Figs. 35 and 36. In the first of these (Fig. 35) the ball entered the

tusk at the right side and passed out on the left. There is no difficulty in determining the exact thickness of the wall of the tusk at the time,—at the thickest point a fraction over one-half inch.

FIG. 36.

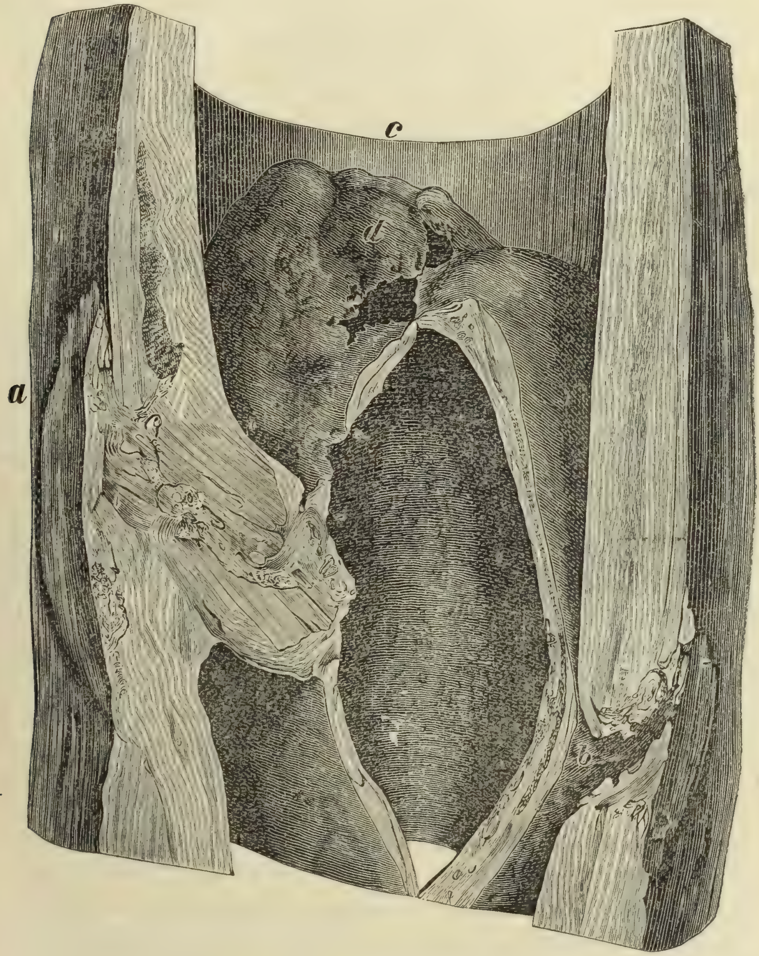

FIG. 36.—A section from near the base of a tusk pierced by a musket-ball. A segment of the section has been sawn off to show the interior. *a*, entrance, *b*, exit of ball; *d*, the wall of an enormous abscess; *c*, pulp-chamber. The portion of the pulp between *d* and the base of the tusk showed very little disturbance in its function.

That the pulp was very severely injured may be readily seen from the fact that on the lower third of the section no deposition of ivory whatever took place subsequent to the injury, while that deposited by the upper two-thirds (a layer about one-half inch in thickness) is very irregular in structure, and consists chiefly of osteo-dentine. The comparatively healthy part of the pulp made an attempt to shut off the wounded—undoubtedly suppurating—portion, by throwing across from each side a jagged partition or wall of osteo-dentine, and would apparently have succeeded in the attempt if the animal had lived a few months longer. This preparation illustrates very beautifully the method which the pulp of the elephant's tusk is always found to employ to protect itself against insults of every nature (wounds, foreign bodies, abscesses, etc.), *i.e.* shutting off the offending part by a partition of osteo-dentine.

In the second case (Fig. 36) the ball entered the tusk on the upper surface three inches from its base, where the wall was three-eighths of an inch thick, and passed out at the outer and under surface five inches from the base. The hunter must consequently have shot upon the animal from a position above it, probably from a tree. The wound was followed by the formation of an immense abscess, which must have resulted in the death of the entire apical portion of the pulp; notwithstanding this, the stump or basal portion shut off the abscess by interposing a layer of osteo-dentine, which is at present from one-quarter to one-half an inch thick. It also added to the base of the tusk a section about three inches long; in other words, the tusk went on growing, without any apparent interruption other than a ring or contraction marking the border between the part of the tusk formed before and that formed after the injury.

FIG. 37.

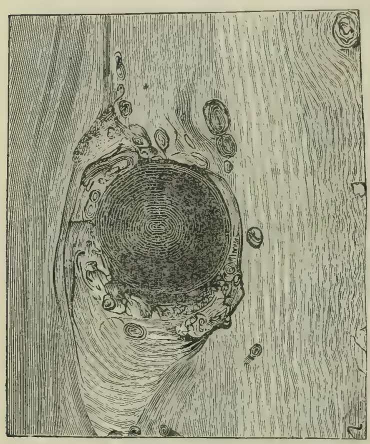

FIG. 37.—A musket-ball imbedded in the tusk of an elephant, showing no trace of the way by which it entered.

In cutting up tusks, the turner occasionally comes upon a ball imbedded in solid ivory without being able to find in the neighborhood of the ball any trace of the point by which it entered. These cases are usually explained by supposing that the ball, having entered the pulp, gradually sinks by its own weight in the substance of the pulp, coming to rest finally at a point some inches, or possibly feet, distant from the point of entrance, where it then becomes enveloped first in osteo-dentine, then in ivory. A cross-section of the tusk containing the ball would thus naturally not show the point of entrance. A case of this kind is shown in Fig. 37.

7. There remains to be considered the case where the hunter from

a tree shoots or drops a weighted spear upon the animal. The ball or spear *may* in such cases pierce the floor of the nasal cavity and enter the open base of the tusk, which is here directed almost vertically upward, without anywhere touching the wall.

Spear-points seven inches long have been found in ivory, lying parallel with the axis of the tusk, whose presence and position can be accounted for only in this way. The fact that such a body may enter the pulp of a tooth without destroying its vitality, on the other hand subsequently becoming completely imbedded in ivory, indicates an enormous vital power on the part of the pulp (see Combe,* Murie,† Tomes‡).

Among the fifty-eight foreign bodies which I have examined in specimens of ivory, there were forty-four iron balls, one flat, rectangular iron body, seven leaden balls, round or cylindrical, one copper ball, two iron cylinders, and three spear-points.

The amount of disturbance produced by a shot-wound in an elephant's tusk varies greatly, as may be seen from the illustrations; sometimes extensive suppurations and formation of abscesses occur, leading to the destruction of a large amount of pulp-tissue; in other cases very little disturbance seems to result from the shot.

FIG. 38.

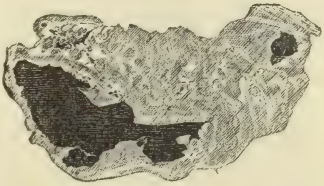

FIG. 38.—A distorted leaden ball imbedded in a fragment of osteo-dentine, showing the absolutely perfect adaptation of the tissue to the surface of the ball.

Leaden balls appear to produce less irritation than iron ones, all that I have seen being perfectly encapsuled (Figs. 27 and 38), and the surrounding dentine indicating a much slighter degree of disturbance than may often be seen in case of iron balls. Once I found the ball immediately surrounded by almost normal ivory. The ball may very nearly retain its shape, or it may be very much distorted, or even torn into pieces, as seen in Fig. 27.

The iron balls which had penetrated to the pulp were, with one exception (Fig. 32), also inclosed in pathological ivory. The balls, however, appear very rusty, and the ivory has not adapted itself perfectly to the surface, as in the case of leaden balls, so that after sawing the preparations through the ball may be easily removed. Often there is a visible space between the ball and the walls of the cavity inclosing it.

Both cylinders were found lying loose in large cavities, which had been subsequently separated from the pulp by a partition of osteodentine.

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* *Philos. Transactions*, 1801, p. 165.

† Op. cit.

‡ Op. cit.

Gunshot wounds of the pulp are also frequently followed by suppuration and formation of large abscesses in the neighborhood of the wound. We furthermore frequently find appearances in the ivory at a point of the tusk lying symmetrically opposite the wound, which can only be explained on the principle of the "*contre coup.*" A ball striking a tusk near its base produces vibrations of the thin cylindrical wall which, in accordance with physical laws, are strongest at a point directly opposite that receiving the blow; these may be sufficiently intense to cause an inflammatory reaction in the pulp at that point. The series of nodules lying along the margin *d′*, in Fig. 31, are to be accounted for in this manner.

The fact that leaden balls become so perfectly encapsuled in the tusks of the elephant, together with the observation of a leaden ball in the jaw-bone of an elephant, completely inclosed in osseous tissue, suggested to Dr. Cunningham the idea of making use of lead in the implantation of teeth, by attaching a porcelain crown to a leaden root. The results of his experiments in this direction on dogs, monkeys, etc., cannot fail to be of great interest both practically and scientifically.

FRACTURES.

Fractures are frequently met with in the tusks of elephants as the result of gunshot wounds or of some other mechanical violence, the nature of which cannot always be determined. They may take place either in the free or in the alveolar portion of the tusk, and may be either complete or partial. They interest us chiefly in presenting an excellent opportunity of studying the process of repair.

Fractures of the free portion of the tusk, not affecting the pulp, are not repaired; the end of the tusk becomes rounded off in the course of time by the friction of wear. Total fractures of the free portion of the tusk, exposing the pulp, seem to be followed by sloughing of a portion of the latter, while the rest protects itself by filling up the pulp-chamber with pathological ivory. (See case described above.)

A few years ago the attempt was made to saw off the end of the tusks of an Indian elephant in the Zoölogical Garden in Berlin. The cut being made too near the base, the point of the pulp was exposed by the operation. The opening has since been completely filled up, as far as can be determined by as close an examination as the animal permits. It is worthy of remark that during the operation the elephant was perfectly quiet until the pulp was reached, when he began to cry piteously and became so unmanageable that the operation could be finished only by breaking off the end of the tusk by a blow of a heavy hammer.

That even the exposed human tooth-pulp *may* undergo calcification is shown by a case related by Tomes ("Dental Surgery," 2d ed., p. 469).

I have seen a case in which the tusk was broken off just within the alveolar border. The stump of the pulp still maintained its vitality, and completely filled up the base of the tusk with a mass of osteo-dentine.

Partial fractures of the alveolar portion of the tusk may be found in numbers in any shop where ivory is worked up in large quantities. They run parallel with the long axis of the tooth, usually beginning at the base and extending to varying distances.

Fractures not reaching to the pulp, *i.e.* cracks in the outer layers of the tusk, are repaired by the pericementum alone; those extending to the pulp are repaired by the pulp and the pericementum conjointly.

FIG. 39.

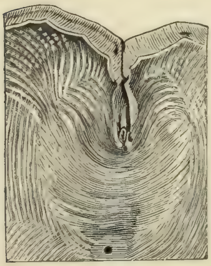

FIG. 39.—Incomplete union of a fracture by a fold of cement, the parts being held together chiefly by dentine.

FIG. 40.

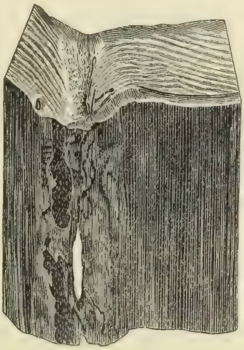

FIG. 40.—Union of a fracture by vaso-dentine, the cement taking little or no part in the repair.

Where the fissure between the fractured parts is very narrow, it becomes filled up with cement, and is bridged over at the surface with a normal layer of cement; where the fissure is wider, a fold of pericementum appears to dip down into it, so that a fold of cement is produced by which the fissure is very much diminished in width, but not always completely obliterated (Fig. 39). In fact, I have seen comparatively few cases where the fracture was smoothly bridged over with cement. The inner portion of the fracture lying next to the pulp, and frequently the larger part of the fracture, is repaired by the pulp, which afterward completely bridges over the rent and heaps up a mass of ivory to hold the parts firmly together (Fig. 39).

In the case of fracture represented in Fig. 40, produced by a gunshot, the union has been brought about almost by the pulp alone, the fissure being filled up completely with vaso-dentine, except at isolated points, where a thin layer of cement is present.

Thus the pulp appears to perform a much more important part in repairing fractures than the pericementum. This observation is in complete conformity with the view expressed by Hohl,* who writes regarding the healing of fractures of the human teeth, "In those cases in which the reparative tissue has been microscopically examined it has been found that the chief part in the union of the fragments is performed by the pulp, whereas the pericementum furnishes only a small quantity of cement."

(To be continued.)

CONCERNING SUPPURATIVE INFLAMMATION.

BY DR. G. S. DEAN, SAN FRANCISCO, CAL.

THE dentist is so often called on to decide whether an extra-dental disorder is dependent, in whole or in part, on some pathological condition of the teeth, and so often effects cures in cases which are the despair of the general practitioner and even of the specialist, that light on the etiology of any peri-oral disease is always welcome to him. Hence I propose to report a case of quinsy which presents its essentials with especial clearness,—believing that the report will be of service in aiding toward settlement of the question (often asked with regard to this complaint) of dental causation.

Another motive, more urgent, also prompts me to report this case. This motive is based on a belief that the suggested etiology may throw some additional light on a dental disease which (as will presently appear) I hold to be essentially of the same nature with quinsy, and is a hope that presentation of the analogy between the oral and the tonsillar affection may lead to some modification in our view of the etiology of the oral disorder, and furthermore to assurance concerning the agent of its production; therefore to more successful prophylactic practice.

It may perhaps be said that a single case proves nothing,—that we need "statistics." And with regard to matters otherwise unanalyzable, there is truth in this remark. But if the single case happens to be "typical," it proves a great deal. It is true that the "extreme case" is ignored in the scholastic logic, which concerns itself with verification instead of with investigation. But I hold it as certain that, when the greater Aristotle of the future shall give us a logic of discovery, the "extreme case" will be shown to have a value with which it has not hitherto been credited; will, in fact, be to the greater logic what the syllogism is to the lesser,—the center, the essential.

That the report of the present case may be intelligible, a preliminary statement concerning climatic peculiarity is needed. California is, as its name is said to indicate, a cali-fornia,—a "hot furnace." In many a plain or valley is located the legend of the wicked man who died and came back next night for his blankets. Such is the climate of the interior. San Francisco, however, between the ocean and the bay, lying under an almost perennial fog-bank and swept by the ocean breezes, suffers constantly from cold. Overcoats are worn the year round.

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* "Über Zahnfrakturen," *Deutsche Vierteljahrsschrift für Zahnheilkunde*, 1870, p. 181.

A further preliminary is desirable—is indeed necessary. I must define or limit my subject ; in other words, must make my diagnosis exact. The word "tonsillitis," like the phrase "Bright's disease," may mean any one of a number of distinct maladies, and I must indicate precisely which one of these I mean. The peculiar inflammations of the tonsil (that is, those inflammatory diseases whose exclusive location is the tonsil) require a threefold basis of classification : they require to be arranged, first, topographically ; second, etiologically ; third, symptomatically. I must therefore, for precision, mark off that in question under each of these three heads.

Topographically, tonsillar inflammations are first divisible into superficial and deep ; that with which we are concerned belonging to the latter class. (To this first distinction I call particular attention, because when, later, I seek the etiology of the case reported, I shall insist that superficial and deep inflammation are different phenomena, to be clearly distinguished the one from the other ; and that, though deep inflammation tends to produce superficial symptoms,—as any one might infer from the modern theory of inflammation, and as every one knows if he has observed the formation of an alveolar or other abscess,—yet the converse is not true ; a mucous inflammation has no necessary tendency to become an adenitis.) Next, they may be divided topographically into circumscribed and diffuse ; our variety being of the latter kind,—being general, as distinguished from follicular. Finally, we may note that, though we call this disease an adenitis, inasmuch as it is a deep-seated inflammation of a glandular organ, yet the word is applicable broadly rather than exactly. For our inflammation is not strictly parenchymatous. Nor can it even be properly called interstitial. Though dissections establishing its primary location are wanting, clinical observation warrants the statement that it is not merely glandular, but also periglandular,—that, in a word, it is an affection of a general locality rather than of a secretive organ.

We pass next to the etiological basis of classification. We have a deep-seated and diffuse inflammation which we must mark off from similar inflammations—etiologically. Our variety we may call idiopathic, to distinguish it from those which are supposed to be local manifestations, symptoms or results of other diseases or conditions of the system, as the typhoid state, gout, scarlatina, rheumatism.

Proceeding to the symptomatic basis, we note that our inflammation is acute, and that its hyperemia has a tendency to spread to organs in proximity to the affected gland. It is normally bilateral,—affecting not one gland, but both (an etiological implication of this fact will appear in the sequel). Finally, it is to be specially remarked that the disease in question is distinguished symptomatically from other non-traumatic affections of the tonsil by its suppurative tendency. Though, frequently, pus does not form, yet the disease is essentially, characteristically, a suppurative inflammation.

Now, preliminaries finished, I turn to my story.

Some fifteen years ago, in San Francisco, the patient whose history I am about to relate made his first complaint of tonsillitis. He was a young man who had "never been sick in his life." He had lived in California three or four years, mainly in San Francisco. In July of the year in question he had taken up his abode in a pleasant house on one of San Francisco's hillsides. About the middle of September he visited one of the warm interior valleys, remained there a few days, was there attacked, and returned to San Francisco while the inflammation was at its height.

The disease was treated *secundum artem*, and in three or four days was cured. There was no suppuration. (I may here say that I was not concerned with the treatment. I naturally observed the measures taken to combat the disease; but my interest in the case was purely dental.)

The young man remained in his pleasant house on the hillside, and was well until the vernal equinox, when he was again attacked—at home this time. The disease was again treated, and was duly cured. But the second attack was more severe than the first, one tonsil suppurating.

The autumnal equinox brought another attack more severe than the preceding, both tonsils suppurating. At the vernal equinox another occurred, another at the autumnal, another at the vernal; each being more severe than its predecessor. He was sometimes treated and cured; at other times he "got well," declining treatment as "certainly painful and not certainly beneficial;" but, though declining the "pound of cure," he desired the "ounce of prevention," and, remarking that he had never had quinsy until he moved into that pleasant house, he moved out of it.

A period of quiescence succeeded. For three or four years he was free from the disease. At length, having again changed his abode during the spring or summer (this time to a house on the plain), the autumnal equinox brought a mild attack, which was not treated; he "simply got well," no suppuration occurring.

He adopted his former system of prophylaxis,—a change of domicile. And, again, for some years, he was free from the complaint. At length he moved to another house, and, at the succeeding equinox, he suffered once more, this attack being more severe than any of its predecessors, but, vigorously treated, being in due time cured.

Another change of domicile, immediately made, was followed by permanent exemption.

I do not propose to notice any of the divers systems of treatment which were employed. The patient uniformly recovered; every line of treatment cured the disease, and so did no treatment at all. My purpose is to discuss, not treatment, but etiology.

Here I note, first, a revolutionary truth. The climatic facts mentioned at the outset require us to reject as an etiological factor the principal cause on which standard writers insist,—cold.

Next I note that the answer to the question, "Will the patient suffer or enjoy immunity?" was in every case determined by his domicile. In certain houses he was sure to be attacked; in others he was sure to be exempt.

One condition was present in all the houses in which he was attacked, was absent from all those in which he was exempt, was great where his attacks were severe, was small where his attacks were light, and was increasing where his attacks were intensifying in severity. This condition was, communication with a filthy drain.

"Sewer gas" has probably been greatly slandered. Without evidence—certainly without adequate evidence—there has been attributed to it a large proportion of the ills to which flesh is heir. But in this case the culprit is fairly convicted; the proof is practically complete. This one agent, and, as far as could be ascertained, no other, was uniformly present when the disease was present, absent when it was absent, great when it was great, small when it was small.

Here, then, we have plainly "the cause." Further I cannot go. I can state, since quinsy appears in "healthy locations," that the poison which produces it probably differs from the volatile matter which gives rise to the city-cachexia or jail-cachexia, the latter affecting the animate organism very much as the gases from a bleach-house affect vegetation. But I have not been able to ascertain whether the agent which in this case produced tonsillar inflammation was a microbe, or whether it was an already-formed chemical poison. I assume, for reasons too plain to need explicit statement, that the agent was connected with putrefaction of organic matter; but, assuming this, I confess ignorance as to everything beyond, merely saying that, whether the agent was living or dead, it was contained in "sewer gas."

Have we, then, in "sewer gas," a full explanation of the occurrence of the disease? By no means. There remains a question which

I cannot answer, namely: Why did it always occur at equinoctial periods?

In other words, the acting cause of the disease is plain; the circumstantial or condition-cause is obscure. "Sewer gas" was the agent which produced the disease; the condition of this agent's action was a change in the environment, of which perhaps (as of that which produces an epidemic, or of that which precipitates an attack of chorea on the approach of a storm) we are no more capable of taking cognizance than were the Aristotelian Greeks of appreciating changes in terrestrial magnetism.

But, though the condition-cause is obscure, the manner of its operation demands attention. Plainly, it gave rise to the disease by producing a secondary condition-cause,—a systemic condition which constituted a tendency or liability. This systemic condition produced the effect either (1) by favoring the entrance of the agent, as by non-resistance (etiology of vaccinia); or (2) by favoring the development of the agent, as by furnishing a soil for organisms (etiology of ascarides or of smallpox); or (3) by favoring cumulation of the agent, as by local stasis or failure of elimination (etiology of traumatic peritonitis); or (4) by acting in the same direction as the agent, or playing the part of a secondary agent or adjuvant (normal etiology of eczema; the "crisis" or cuticular eruption produced by the "pack" of Priessnitz may be an example of double agency); or (5) by non-resistance, not to the entrance of the agent, but to its operation (etiology of irritant asthma or "hay fever"); or (6) by disturbing the unstable equilibrium of the poison-bearing tissue (etiology of the milder forms of metallic synovitis). To abbreviate, let us group these modes of operation of the condition-cause, bringing them into two classes of three modes each, which we may call: 1, favoring the agent; 2, favoring its action.

The fact, or at least the strong probability, that on one occasion the disease appeared some days after the patient's removal from the house where it was contracted, seems at first glance to show that the condition-cause was effective in one or more of the ways of the first group,—that is, by favoring the agent. It seems to indicate kin between quinsy and the infectious diseases; there seems to be a period of latency or incubation which is so similar in quinsy and in smallpox as to suggest likeness of etiology. On the other hand, the fact that the severity of the attack appeared to be proportional to the amount of poison to which the patient was exposed seems, not indeed to prove the absence of an organized zyme, but to suggest that the condition-cause was effective less by favoring the agent than by favoring its action. It seems to indicate kin between quinsy and the effects of non-organized poisons,—*e.g.*, gout-poison, which probably cumulates unnoticed, until, at length, some condition-cause leads to its violent action. As the latter hypothesis is the one which the more readily accounts for all the facts, I shall, for convenience, adopt it in the present discussion ; in other words, I shall suppose that the condition operated in one or more ways of the second group,—that the poison, gradually absorbed, remained latent until it was seconded or resistance to its operation was enfeebled or the unstable equilibrium due to its presence was disturbed, or until all of these factors simultaneously favored its action. To state the matter in the briefest way, I shall assume that putrefactive poison, conveyed through the atmosphere, was the predisponent of disease, and that a change in cosmic forces was the excitant.*

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* I here use the words "predisponent" and "excitant" with their normal significations,—predisponent meaning cause of liability to disease, excitant meaning cause of precipitation of disease. There are not wanting those who will criticise, in the present case, this employment of these words, basing their criticism on the fact that, in zymotic diseases generally, the *materies morbi* or the organism which produces it is called (correctly) the excitant. I may therefore be pardoned for saying a word on etiological nomenclature. "Cause," whether in physiology or in physics, or anywhere else, is a compound word ; that is, there are everywhere two factors of cause,—the *agent*, and the *conditions* which determine the action of the agent. This fact must, in time, receive recognition in physics, which is the mother of sciences ; and the daughter sciences must follow the mother. We shall, in time, come to speak of agents and conditions of disease as familiarly as we now speak of predisponents and excitants. But the words "agent" and "condition" will not banish the words "excitant" and "predisponent," for the reason that the terms are not convertible and the latter words are needed to express what the former do not (indeed, if medicine becomes indebted to physics for the former words, physics may become indebted to medicine for the latter, they having utility beyond the bounds of medical science). The agent is sometimes the excitant, as in diphtheria or smallpox. In other cases, the agent or acting cause is the predisponent. Take a super-saturated solution of sodium sulphate ; it is predisposed to solidification, the agent of solidification being the predisposing salt. Let the glass be struck ; the solution is excited to solidify, the condition of solidification being the exciting vibration. Now, for the sodium sulphate substitute sodium urate, and for the glass substitute the blood-channels of a man ; there is a tendency, liability, or predisposition to gout, the agent (which is here the predisponent) being the sodium urate. Presently the salt in the blood, like that in the water, is excited to crystallize—how, we do not know ; but it is plain that that which excites its crystallization is the condition, not the agent, of the disease. And what is true regarding gout is true (if we accept the alternative which for simplicity we have chosen) regarding quinsy. The agent or *materies morbi* is not the excitant ; it is, on the contrary, the predisponent or that which produces the predisposition. (The atmospheric or cosmic condition which is now the excitant—as in quinsy, and perhaps in gout, asthma, and other diseases—may be elsewhere the predisponent, as in epidemics of cholera and so on.) Let me

Choosing, then, the hypothesis which with least straining of our present knowledge fits all the facts, let us proceed to qualify the basal truth which it presupposes, and then let us clearly see that this basal truth (either our hypothesis or its rival herein presented) must be accepted.

First comes qualification or limitation. Do I say that the universal predisponent to suppurative amygdalitis is aerial poison, and that the universal excitant is an imperceptible cosmic force? No; scarcely even the former; certainly not the latter. There may be many agents which, acting on the human body, will give rise to a tendency to the development of a particular group of symptoms,—a "disease." And there almost certainly are multitudinous excitants which will precipitate a catastrophe for which the system is prepared. Cold, wet, fatigue, are powerless in the absence of the predisponent; but when the predisponent is present, the attack may be precipitated by a breath of air, a dash of water, a trifling exertion,—may even, perhaps, when the predisponent becomes overpowering, be really "spontaneous."

Yet, while admitting the possibility that there may be divers predisponents, as well as the probability that there are numerous trifles which may act as excitants (precipitants) of the disease, I believe that the usual predisponent is that which was evidently the predisponent in the case here reported. The reasons for this belief are two, namely: First, observation of other cases whose conditions precedent were such as to confirm the theory of etiology here given,—especially of household quinsy epidemics, and of one house in which successive families suffered; second, observation of local symptoms in certain cases before the appearance of systemic symptoms,—tending to show that the disease is originally, like a dissection-wound, local,—indicating, in other words, that the disease is, though not independent of the "state of the system," primarily dependent on the state of the tonsils (whose function, though unknown, has been stated by independent observers to have an absorbent factor).

So much for qualification, and, incidentally, confirmation. Next, let us emphasize the basal truth. Our first step in emphasis will properly be negative,—will be an observation showing the untenableness of the current belief. At one equinoctial period, when living in a house in which he had always been free from quinsy, our patient "caught cold,"—had an attack of catarrhal pharyngitis. Naturally he anticipated a visit from his old enemy; and if he had consulted the works of all authorities, his mild anticipation might have become confident

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add, lest I be misinterpreted, that the predisponent of acute gout or the gouty paroxysm is quite a different thing from the predisponent of formation of uric acid.

expectation. But in a few days the inflammation subsided, having been confined to the mucous surface, and not having affected the substance of the tonsils at all. In other words, though the precipitants of quinsy may frequently be identical with those of coryza or pharyngitis mucosa, yet quinsy is not "a cold," which "settles" in the tonsils, because these glands are inherently, in the affected individual, *loci minoris resistentiæ.*

Next, for positive emphasis. The current belief is, we have seen, untenable. What, then, according to a just interpretation of the phenomena, is ordinary suppurative tonsillar adenitis? It is (with some features which, though perhaps everywhere existent, are here peculiarly manifest) a particular case of the general truth that putrefactive poison causes local inflammation, which inflammation gives rise to general or constitutional disturbance, and, if severe, will terminate in pus-formation. Whether we accept the hypothesis here chosen or its alternative, is indifferent as regards this fundamental fact. Whatever our hypothesis concerning predisposition and excitement, it is scarcely to be questioned that there is a poison which, aerially conveyed and locally absorbed, is the agent of ordinary quinsy; this poison being akin to that which gives rise to the two forms of the hospital disease,—puerperal sepsis and surgical fever.

Passing now from truth-seeking to application, we see, first, that if dental disturbance ever directly produces the tonsillar disease, it is by excitement, not by predisposition,—or, at least, as condition, not as agent; and, second, that dental conditions, by permitting putrefaction in pulp-chambers, may tend to indirectly produce the tonsillar affection,—may give rise to the agent or *materies morbi*, and may thus, to an appreciable extent, predispose to quinsy. But there is a third matter which most forcibly attracts attention; this is the similarity between tonsillar and apical purulent inflammation. It is impossible not to compare apical pericementitis with tonsillar adenitis,—the alveolar with the tonsillar abscess; and the comparison, if the origin of the tonsillar inflammation has been clearly shown, must tend to strengthen our faith concerning the origin of the pericemental disease, and perhaps to modify to some extent our view concerning its causation. If we assert that the tonsillar affection is produced by a poison which is absorbed from without and which when conditions favor acts locally in the neighborhood of the absorbing organs, we almost necessarily assert that the pericemental disease is due to a like poison similarly circumstanced. Exceptions, indeed, there may be. There may be cases of suppurative inflammation of the tonsils not due to locally-absorbed poison, and cases of alveolar abscess not due to locally-produced poison, just as there are cases of abscess of other parts not due to local entrance of microbes or putrid matter. But that migratory or systemic (microbic or sterile) suppurative inflammation frequently makes the tonsil or the apical region its seat, is an assumption without evidence; whereas the contrary belief, that local poisoning is in these locations the usual cause of purulent inflammation, is sufficiently supported to require evidence as a basis for refusal to accept it.

It may be well, before closing, to note that the fact that quinsy is a disease, not of infancy, nor of old age, but of early middle life (a fact not recognized in the current etiology), is in full harmony with the etiology here given. For, according to our explanation, the disease depends on the absorptive function of the tonsils. Now, it is a general fact that glandular function varies with advance of life; from which general truth, by legitimate analogy, we may conclude that tonsillar function varies. On the one hand, as many glands (*e.g.*, the submaxillaries, the lachrymals, the mammæ) do not assume their complete functions until some time after birth, so may it be with the tonsils,—liability to quinsy not appearing in infancy because tonsillar function is not complete. And, on the other hand, it is not unlikely that these (probably useless) glands may be early reduced to a comparatively functionless condition, liability to quinsy being thus obliterated. In a word, I compare quinsy with mastitis, not as regards the manner of introduction of the agent, but as regards the conditions of disease; holding that, in quinsy as in mastitis, the primary condition precedent is functional activity of a gland, while the secondary condition precedent (here regarded as a result of the excitant) is a change, usually somewhat sudden, in the relation of solids and fluids in the organ.

It has been already admitted that the etiology herein presented differs completely from that given by all authorities. But as the authoritative explanation is quite groundless,—is absolutely devoid of a basis of evidence,—it must fall before any which has even the smallest foundation of proof, and must vanish utterly when confronted with the demonstrative facts of a typical case. Accepting, then, not necessarily the secondary hypothesis, but at least the basal etiology suggested by this case, we may assert that pathological conditions of the teeth are seldom important factors in the production of quinsy, though these conditions may sometimes have an influence both as predisponents and as excitants. But we may also assert that, even if quinsy were certainly never in any degree dependent on dental disease, it would still interest the dentist, for the reason that it is caused as alveolar abscess has long been believed to be caused,—that is, by putrefactive poison.

Postscript.—Since the above was written, Vol. VII of the "Reference Handbook of the Medical Sciences" has appeared. It contains an article on tonsillitis, from the pen of Dr. Delavan, wherein it is remarked that amygdalitis attacking several persons in a house ("spreading quinsy") is "rarely observed without the coexistence of a definite source of infection," which expression the doctor moderates or explains by appending the phrase, "such as bad sanitary surroundings." The statement quoted is certainly the strongest in the article; it is also true that this statement lacks the definiteness which the doctor predicates of the source of infection,—that he seems unwilling to be definite with regard either to the form or forms of tonsillitis which he holds to be due to infection or to the source or character of the poison which produces it or them; but it appears, not only from the remark cited, but elsewhere also in the article, that, though the evidence known to him is not sufficient to give definite knowledge, it has led to a strong hypothetical belief that some form or forms of tonsillitis is or are due to aerial poisoning. The remark which I have quoted is not, therefore, a mere slip of the pen.*

Dr. Delavan is, then, the first to announce that there is (or may be) a form of tonsillitis due to infection,—an astonishing fact, since the micro-organism has been invoked to explain almost everything else, explicable and inexplicable; and a fact the more astonishing since we have in pelvic cellulitis a disease so similar to quinsy and demonstratively due to local putrefactive poisoning.

(To be continued.)

MATTER AND FORCE IN THE ORAL CAVITY.

BY S. B. PALMER, M.D.S., SYRACUSE, N. Y.

(Read before the Dental Society of the State of New York, May 14, 1890.)

MR. PRESIDENT, AND MEMBERS OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

It is doubtful if the English language contains two words more expressive of the changes which occur in the oral cavity than those which head this paper, nor are these limited to the mouth. All that appeals to our senses in relation to the universe and the things therein can be traced back until lost in what we call matter and force, of which we really know very little. Let us assume that force is the soul of matter, as there is no dead matter. Nor can matter be so separated but that every molecule and atom will retain the force principle. Through science we are able to understand some of the principal relations existing between matter and force, and to know that all changes are effects of causes. We can safely act upon the knowledge that with the same materials, used under the same circumstances, the same results will follow. This is most assuredly so in the field of our operations. When a dental filling is inserted, it becomes a cause; the effects are not determined by our desires or good intentions, but strictly in relation to the principles as applied to the special case.

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*The doctor's words, apart from the quoted statement, are these: "The exciting causes of tonsillitis are usually ascribed to wet and cold. There can be no doubt, however, but that septic influences often play an important part in their production, and the writer ventures to predict that this question will receive in the future more extensive consideration than has heretofore been accorded it. Besides these things, bad hygienic surroundings, bad drainage, sewer gas, all may be directly concerned in the production of the disease in its various forms; and it is highly probable that, without the existence of some predisposing general condition, the chilling of the surface of the body through exposure to cold would have little effect."

This being a fact, it is important to understand how to so harmonize cause and effect as to produce desired results; in short, to anticipate the end from the beginning.

Correlative forces are connected with the composition and decomposition of the various forms of matter which surround us. From a number of these we present but one principle only, the one most potent in the changes of all matter and the one most essential for observation in the oral cavity.

It is that principle called *potential*, which also includes *polarity*.

"Difference of potentials is a difference of electrical condition, in virtue of which work is done by positive electricity in moving from the point of a higher potential to that of a lower potential."

To illustrate: the two elements in a galvanic cell are at different potentials, and the work is done by movement of the electric current from the higher to the lower. The hundreds of wires strung overhead are but conductors for currents passing from one potential to the other; the thunder-bolt is but another illustration that the clouds are of a higher potential than the earth. Other and more practical illustrations will be given hereafter in discussing at some length the action of this principle upon the matter with which we have to do in our operations. In 1874 I read a paper before this society entitled "Galvanic Action upon the Teeth, and the Materials used for their Preservation." The subject was then new and little understood. The doctrines inculcated, as well as some of the materials recommended, were antagonistic to the belief of the time. It was said that if the "electro-chemical theory" was admitted to practice it would have a tendency to degrade the profession, by lowering the high standard of American dentistry. Sixteen years have passed, and the theory has been freely and broadly discussed. The profession has passed through stages of evolution, revolution, and progression. Prejudice has yielded to scientific teachings, and the preservation of teeth is now considered paramount to the materials or methods used for that purpose. We realize, however, the benefits of a higher and more liberal education, the addition to our membership of graduates who are pursuing special lines of study, by which we are receiving knowledge of practical importance which was unheard of in the past. Recognizing this, I have the pleasure of contributing my mite in a brief summary and *finale* of this special line of investigation, believing that it will be taken up, developed, and reduced to general practice by those who have enjoyed electro-chemical instruction and have facilities for carrying on the work of investigation.

Chemistry teaches that known matter consists of about seventy simple elements, which are presided over by many forces. As oxygen is called the king of matter, so electricity might be denominated the king of forces. It is apparent to our senses in nature from two extremes : in statical electricity, as discharged from the clouds, also called frictional electricity, which includes that generated by the dynamo ; and by chemical currents generated from chemical action in a battery. The products are the same. The latter method alone influences dental operations, and in that case the chemical changes take place in the oral cavity.

Let us commence at the lowest point of chemical disturbance and work up to electro-chemical action.

When acid is dropped upon polished marble, effervescence occurs, the polish is destroyed, and a shallow cavity is the effect. When the disturbance ceases, a salt has been formed, leaving no evidence of electrical force ; perhaps for the same reason that various microbes have not till recently been discovered, for lack of study and proper instruments. One step onward, and we will introduce this occult force to the sense of taste.

In a glass of soda-water direct from the fountain we have chemically nearly the same action as described with acid and marble. If the water is drank during effervescence, there is an agreeable sparkling taste not present after its subsidence.

The soda fountain is a device for generating carbonic acid gas. Water charged with this gas, when brought in contact with the saliva, renders this force agreeably perceptible.

Seeing is believing, and your thoughts are directed to the galvanic cell, which is an arrangement that will separate and gather up electricity from chemicals in quantities to render it available for medicinal, mechanical, and commercial purposes. We will not consume time in describing a galvanic battery, as its common construction is well known.

In the simplest form of a battery we find clearly illustrated the principles now under discussion. In this respect the cell, with a copper and zinc element immersed in water only, represents polarity, difference of potentials, chemical disturbance, composition and decomposition, and the electric current. The addition of acid would greatly increase the action but add nothing to the principles involved.

This simple cell is a cosmos in this respect: it represents the laws of the universe in changes of matter, and clearly exemplifies their workings in the oral cavity. With this battery in mind let us name a principle, trace its analogy in the physical universe on one extreme, and in the field of our operations on the other. A slip of metal standing in a glass jar of water becomes polarized. A rod of iron outside of the battery shows the same phenomenon; in fact, any iron rod or mass of iron becomes polarized, as is proven by the compass needle. The galvanometer will demonstrate the same principle in any metallic filling in the mouth.

Polarity in crown fillings is shown to be on the outer or grinding surface, and to be opposite on the inner surface next to the dentine. I speak of this principle as polarity; it may be potential according to the definition given, which we repeat: "Difference of potentials is a difference of electrical condition, in virtue of which work is done by positive electricity in moving from the point at a higher potential to that at a lower potential." A gold filling inserted in dense tooth-structure is simply polarized; it is like the copper in the fluid: there being no positive element, there is no difference in potentials, no current established. If, however, the dentine is decalcified or deficient in lime or inorganic matter, as may be seen by decay in children's teeth, the positive element is added, and there is then a difference in potentials, with its attendant consequences. Approximal fillings extending from the occluding surface to the margin of the gums are much more liable to produce chemical disturbances, from decomposition of matter lodging at the base of the filling.

Reverting to the battery, we learn another lesson still nearer actual practice. Let us insert a rod of zinc into the cell, and, according to law, it becomes a negative element, and the water positive; place a piece of copper upon the zinc, above the water, where the rod is perfectly dry, and the zinc becomes a positive element. The combination would represent a bar magnet; the copper the negative pole; the zinc the positive; add a rod of copper standing opposite the zinc, and the battery is complete, with two elements of different potentials. Unless the two rods are connected outside, no current is formed, and the slight action caused by the presence of the two metals would well represent simple chemical action; connect the two, and electric chemical action ensues. The dynamo runs with no electrical resistance with an open circuit; close the circuit, and the resistance is according to the work done on the line. I wish to make this point plain. Fillings are like Leyden jars: they are charged with potentials, but harmless without a discharger. If, however, fillings of widely differing potentials are so nearly located that food or mucous membrane establishes a closed circuit, work is being done, chemical action becomes electro-chemical, the acid resulting therefrom increases the potential, and is the cause of sensitive dentine in connection with approximal metallic fillings, under leaky fillings, or poorly cemented crowns. Thus secondary decay is not a myth, but a scientific fact. By way of comparison, dentine below normal density, as well as food that is allowed to ferment in pockets or between the teeth in connection with any metal worn in the mouth, either for plates, bridges, crowns, or fillings, corresponds with the zinc in a battery. There is no *clash* between the "electro-chemical theory" and the "germ theory." Fermentation produces acid, while acid is also a product of electrolysis. Metallic oxides and sulphides arrest fermentation and change the potential of *positive* elements to *negative*, and thus retard decomposition.

Both meet in harmony as to the cause of decay; both point to a common remedy,—cleanliness; and thus, though electro-chemical action is more destructive than is simple chemical action, the difference is only in degree.

Look at decay of posts near the ground. Dry posts are not conductors; they are polarized during rainfall incidentally, and as far above the ground as they are damp from capillary attraction constantly.

The line of oxidation is slightly above the surface line. The zinc pencil in the Leclanche battery is most eaten away at the upper portion of the fluid.

The pole of a permanent magnet is not directly at the end, but near by. Cavities appear in teeth not under the gums but above. Notice a long-used vulcanizer, and the shell will be found thin at the water-line, with little or no deterioration at the bottom, through which all heat passes. The question has been asked as to the cause of this phenomenon in relation to the vulcanizer. As the answer is not foreign to this subject, it will be given in a few words. The vulcanizer, while heated, shows polarity the same as any stove in which fire is burning. The chemistry of a vulcanizer would fill many pages. It is sufficient for this illustration to say that the flask, with its contents, is a positive element in relation to the copper boiler. In the decomposition of plaster and in the vulcanization of rubber, oxygen and other elements are set free which have affinity for copper in the condition it is at the neutral line, but it does not act readily on other portions of the boiler, showing that the force is more than simple chemical action. Not only is the flask a positive element in relation to the copper boiler, but it, too, has its potentials. If the flask is cast iron, there is potential between the wrought bolts and the cast metal, the bolts being negative. With the bronze flask the bolts become positive ; the result is that bolts will be destroyed by oxidation in much less time in connection with a bronze flask than with cast iron. Some writer has advised putting a piece of zinc into the vulcanizer, which would be positive to every other metal used in connection, and, of course, the flask would not be so black from oxidation. The suggestion is from a scientific stand-point, but, *practically*, before any one tries the experiment, it would be well to discard the thermometer and use a pressure-gauge ; also secure a liberal accident policy, as the rapid oxidation of zinc by reason of sulphuric acid liberated from the plaster generates hydrogen gas, which leaves a wide margin between the registration of heat and pressure.

Those who previous to the advent of rubber made temporary plates of silver, using soft solder to connect the backings to the plate, remember that the rim of solder, with the teeth, would separate from the plate quite as soon as the mouth would be in readiness for a permanent denture. Not until this work went out of use did it come to my mind why this occurred, or what would have been a remedy. First, it was the metal which composed the tinning upon the silver that became an electrolyte. This compound was positive, as compared with silver, and the solder, which was an alloy of tin and lead. Now, what had been added to this lamina called the tinning surface ? Silver and zinc, the latter being furnished in the muriate of zinc solution used in tinning : this explains the mystery. Had there been a few layers of gold foil used at the joint, the standard of fineness would have been raised above either the plate or the soft solder. Here we reduce this principle to present practice, and have an illustration of this law in the separation of amalgam fillings, where fresh amalgam has been added to that which had been in a tooth for considerable time.

Observation shows separation in some cases and perfect union in others.

Although these varied results are in themselves of no great importance, they show that without a knowledge of the causes dental practice in that particular must be empirical.

Yet if two plugs of the same potential are united and represent one filling, there is no perceptible current between the two ; the mercury which acts as the solder is taken up by the amalgam, and a joint is made of an element not unlike the mass, consequently there is no separation. Again, two grades of amalgam may be inserted at the same sitting with a perfect union of the two. As an illustration, a filling consisting of a high-grade amalgam may be faced with amalgam containing zinc, with no action at the line of junction, because the material connecting the two is composed of a compound made up from both, which would be negative to the facing, and there would be a blending of the two elements from the negative to the positive.

Where an amalgam filling that has been worn in a tooth receives an addition of an amalgam which is of a higher grade, or is negative to it, separation will follow, the cause being that the lamina uniting the two is not a blending, as above described, but the interposition of a solder positive to either. Mercury enters the surface of the original filling, carrying nothing with it to raise the standard of fineness ; on the contrary, an excess of mercury weakens or renders that portion positive to the plugs on either side ; true to the law of potentials, separation occurs, whereas one thickness of gold foil at the juncture would change the potential and preserve the union.

In adding amalgam to gold fillings or in filling with gold upon amalgam the union is perfect, for this reason : the solder which unites the two pieces is composed of mercury, the alloy of which the amalgam is made,—and the gold which amalgamates with the solder in the process of manipulation ; in short, gold is added at the joint, thus making the uniting material finer than the amalgam.

Let us follow this principle to the combination of gold and tin, when the latter is used as a guard-filling at the cervical border. If tin contained cohesive properties, there would be no separation at the joint in contact with gold, because under favorable circumstances and in the right proportions gold and tin foils combine to make an alloy, so that the surfaces at the union of the two metals would become an alloy finer than the tin. Unfortunately, tin is not cohesive, and I find that guard-fillings of tin are electro-chemically wasted, and are not as lasting as amalgam.

At the outset my investigations were conducted upon the tin basis for two reasons : first, as against amalgam, there were strong prejudices which would condemn the theory without discussion ; second, tin had credit for antiseptic properties that were not claimed for gold. Thus the combination of tin and gold was not so objectionable, and I concluded to establish the principles upon a basis least antagonistic to practice.

A little later I learned that Dr. Flagg had substantiated the theory by empirical practice, but the time had not come to announce a practice so radical.

The following quotation from Dr. Flagg's statements refers to practice as early as 1860 : "I commenced the use of tin foil, amalgam, and gutta-percha as guard-fillings at the cervical walls ; not because they were soft and could be more perfectly adapted to the parietes, but empirically, because I had noted that fillings made from these materials permitted occurrence of decay less promptly than did gold, even when worked by the best manipulators of that day."

Sixteen years ago I was not in possession of his practice, nor had I anyone to advocate the electro-chemical theory. It was a relief when Dr. N. W. Kingsley, a prominent dentist and member of the State society, boldly announced that he used amalgam instead of tin as a guard-filling under gold. This statement had weight, and was of much importance to the theory under discussion.

Whether much or little amalgam is used under gold, the union is perfect. The line of oxidation is carried past the joint for reasons already given. Call to mind, if you please, the weak points of vessels with copper bottoms and tin sides. It will be seen that the tin plate becomes perforated or weakened not directly at the union on the copper and iron, but a line or two above. We account for this fact that the copper and solder, in connection with the iron, renders that portion of the latter in immediate contact negative to the mass of iron. That is, this portion of iron not affected is of the same potential as the copper and solder used at the joint; the "clash" occurs where there is a change of potential. A proof that iron is thus polarized may be seen in soldering zinc to steel fixtures to be worn in the mouth, or in any article of galvanized iron. Zinc, in contact with steel, raises the latter above its normal rating as an oxidizable metal, while tin, copper, or silver-plating depresses its relations according to the difference of potentials.

Iron, when exposed through the zinc coating, resists oxidation; exposure through silver-plating increases oxidation, as seen in steel table-knives with the silver-plating worn through. No better illustration of the change of polarity can be given than the statement, as a matter of history, that a message from America to England was transmitted through the Atlantic cable by a single battery, the cell being a gun-cap; the return message was from a battery consisting of the queen's ring filled with sea-water. By this small amount of electrical force the polarity of the cable was changed and the galvanometer reflected the messages. We should not be too incredulous of the statements of patients respecting disturbances liable to occur from difference of potentials of fillings, or susceptibility to mercury, when we know how few grains of mercury produce ptyalism or constitutional derangement of saliva. Fondness for electrical investigation, together with forty years' experience in wearing dentures of various materials, affords the writer knowledge not to be gained from text-books or from any other source. It may be of interest to state that in one case a twenty-carat gold plate decomposed the saliva, and for several days caused great annoyance to the wearer as well as to myself. The fineness of the gold settled all queries in regard to impurities of the metal, so I knew that the real cause of thinness and flow of saliva consisted in having introduced a negative element. To wait for nature to make proper adjustment and to devise something to satisfy the mind while waiting were the only things to do.

The complaint was not groundless, but nature effected a cure. A marked case of polarity occurred in the case of a boy who came to the office crying from the effects of inflamed dentine in a crown cavity of a lower molar. Orifice of cavity rather small; cavity large; pulp not exposed; on examination found the point of a lead pencil wedged in and broken off level with the enamel. With much difficulty the plumbago was removed. The lesson taught is, that by the presence of a negative element the contents of the cavity became positive and electro-chemical action ensued; had the point been of wood, or even a berry seed, as we sometimes find, no such disturbance would have occurred. This will help to understand the failure of zinc-phosphate fillings at the margin of the gums, or when used for guard-fillings under gold. Recently three reasons have been given in the journals by as many writers; no two agree, and the reader is left to take his choice. To know for myself, tests were made as follows: Three glass tubes two inches long were filled at one end for one-half inch with zinc phosphate; the material was forced out of the tubes one-eighth of an inch; into each of two of the tubes, at the open ends, was inserted a staple of fine copper wire, reaching into the filling in the tube and extending out at the other end to form a loop; the open ends of all three tubes were sealed with wax, two tubes were connected with the electrodes of three Leclanche cells and suspended in water, the third was dipped into the water. No change after two weeks. Ammonia was added to the water. One week, a slight shrinkage. Acid water was substituted; in twenty-four hours one-half of the material from the two suspended was taken away; a slight change only on the third.

This statement appears in the writing of the late Dr. Turner: "Feeble agencies operative for a long period are often just as efficacious in effecting great changes as powerful agents at work during a short period." So long as operators believe that the failure of phosphate fillings at the cervical border is due to defective manipulation, they will strive to do better work with no better success.

The law of potentials must be observed. The same is true in regard to the use of gold in teeth below normal density. All is owing to the conductivity of dentine, which has so often been disputed. If there are any of that opinion still, they may become convinced by constructing a battery as follows: Solder a wire to a bicuspid gold crown; to another wire solder an amalgam filling one-half the size of crown; wrap the amalgam loosely in bibulous paper and force it into the cup; wet the paper with lemon-juice, and the battery is complete; use insulated wire conductors; make a coil of one electrode so that it may be held under the tongue or between the cheek and gums; with the other electrode touch any filling in the teeth, even of long standing, and make up your mind according to the effects. The battery here recommended does not exceed many combinations of gold and amalgam actually worn in the mouth. What seems to be a misfortune—that saliva is so susceptible to change by this force—is by nature a source of delight in the relish of food. Few, I apprehend, realize the delicacy and pleasure afforded by the electric seasoning of food. The broiling of meat, toasting of bread, roasting of coffee and peanuts, are processes by which charcoal or the carbon element is furnished of a different potential from the saliva and other portions of food not carbonized. The passage of a current from the positive to the negative produces the difference in taste that is well known to exist between broiled and boiled food. The invigorating thrill of the electro-thermal bath externally has an internal significance in the effervescent taste imparted to ale or cider when drunk from a pewter mug.

Perhaps no other calling has so much in connection with this principle as dentistry. The dentist is employed to look after and keep in order the organs of mastication, which are agents doing duty in the oral laboratory where food is prepared for deglutition and digestion.

We have endeavored to show that all these processes are connected with potential, a knowledge of which would aid in diagnosis and save much time over the empirical method of gaining knowledge from practical experience.

"Looking forward" a few years, we glance at the lecture-notes from the chair of Dental Chemistry, and quote the following: "Gentlemen, lay in the corner stone of investigation and practice this principle: Things with which you have to do, and the results of your operations, will be presided over by laws, and not happenings or chance. You are to enter upon your professional duties with a limited invoice of stock,—matter and force. Be not disheartened, though their combinations and multiplications transcend human comprehension.

"You cannot separate matter and force; you may and should become acquainted with the principles most intimately connected with your practice. With physical law 'there is no variableness, neither shadow of turning!'

"The potent force in determining your operations is electricity, which is manifested in potential as you have been taught. It appeals to the sense of hearing in thunder tones from Mount Sinai down to the still, small voice heard through a long-distance telephone.

"We see its power and adaptation in lighting a city or illuminating the oral cavity. It caters to taste as experienced in partaking of broiled steak, buttered toast, or a cup of coffee.

"It is apparent to the sense of touch in shocks from the 'deadly wire,' or by contacts of gold and amalgam fillings. The force that guides the mariner on the trackless ocean, through polarity of the needle, may guide you in adapting filling-materials to the conditions of the teeth. Bear in mind that the results of operations are the effects of positive laws ; study the principles, work in harmony with nature's requirements, and success will crown your efforts."

"PYORRHEA ALVEOLARIS."

BY CHAS. B. ATKINSON, D.D.S., NEW YORK, N. Y.

WHAT is pyorrhea alveolaris? A disease following congestion of the myxomatous tissue of the oral cavity, affecting, with wide range of loss, the gingivæ, alveoli, and teeth, from slight recession of the gums to entire solution of alveolus, and the consequent loss of tooth or teeth involved ; therefore perhaps more properly "pyogenic gingivitis."

The writer's experience, observation, and consultation point to the following teeth in the order named as being affected with this disease :

1st, inferior incisors ; 2d, superior molars and bicuspids ; 3d, superior incisors ; 4th, inferior molars and bicuspids.

Cuspids resist pyorrhea alveolaris strongly, although they alone are sometimes affected, and then to a very great degree, and more often the inferior cuspids than the superior.

In some instances the disease progresses slowly, and even terminates without serious loss and without treatment. In others its progress to extensive suppuration is rapid, and grave loss ensues. Usually it is a gradual but appreciable progress, with intermissions of retarded suppuration, but an average steady advance to eventual edentulous maxillæ.

The affected upper teeth are more readily controlled than the lower. Why? The immobile upper jaw furnishes a firm base to which the teeth may be confined, and what movement the teeth have is not influenced by the jaw in which they set. Further than this, the secretions of the mucous follicles and of the parotid glands all tend toward the lower jaw. Therefore the chemical reactions are not possible on the upper jaw that are possible on the lower.

The lower teeth set in the moving jaw and are played upon constantly by the tongue, strained against by the lips, float in fermenting fluid (delivered from the parotids and upper jaw), added to which are the secretions of the sublingual and submaxillary glands. The reduced quantity of both alveolus and denser bone in the inferior maxilla, and indeed its very shape, permit an elasticity of the jaw itself which goes far to defeat treatment of the lower teeth. This seems to be why a fixture is especially indicated on the lower teeth, when the upper teeth *may* be controlled by merely medical treatment.

How do we recognize a case of pyorrhea? Perhaps the earliest condition presented to us is a tumefaction of the margin of the gum,—from pearly red and light lilac to purplish blue in tint,—sometimes puffing to such an extent as to be easily confounded with an alveolar abscess. The tumefied gum readily bleeds on brushing. A probe passed carefully under the gum will disclose a pocket embracing more or less the circumference of the root, in some places nearly or quite to its apical end. Sometimes the gum will be found receded, perhaps on one side only. A purulent discharge, more or less marked, may be demonstrated by pressure of the finger over the root, from its end toward the crown of the tooth. A further demonstration of the presence of pus may be secured by injection, about the necks of the teeth, of peroxide of hydrogen. A general hypertrophy of the oral tissues may be noticed. Suppuration, perhaps preceding, perhaps following, a solution of the dental ligament, which permits the pockets to be formed, and is the antecedent usually responsible for the loosening of the teeth. This loosening may, however, be present as a result of inflammation before suppuration has succeeded. The loosening may be attended with recession of the gum or not, and with or without pain.

What associated local and systemic conditions may we look for?

Locally, aside from the gingival congestions already noted, the teeth may be found elongated, the breath fetid, tartar freely present (although many cases progress to disaster with no appreciable deposit of tartar), pus sometimes oozing from the sockets, putrid taste in the mouth, the tenderness of the teeth already noted, and many times considerable irregularities, the natural result of the loosening of the teeth.

Observation may disclose such systemic conditions as stomach dyspepsia, catarrh (general or local, as nasal catarrh or other mucous surface debility), constipation, phthisis, adenoid growths, general congestion due to intemperance, kidney-diseases, rheumatism, cold feet and other extremities, indicating poor circulation and malassimilation. Dr. Rhein has truly said that incurable systemic disorders make only palliation of pyorrhea probable.

What is the most frequent systemic antecedent? Gastric dyspepsia and nasal catarrh are perhaps equally responsible above other systemic disturbances.

What operative procedures are indicated, and in what order? In answering this question it seems proper to consider a grave case as embracing, if more than, still substantially what one less afflicted would involve. Finding the teeth loose and out of place, their return to place laterally would be a natural first indication, in which normal position they should be tied with waxed sterilized silk ligatures.

It will be found perhaps wiser, all things considered, to deal with the upper jaw first; however, isolated teeth in the lower jaw, if specially affected, should be at least placed in position firmly until further attention can be given them.

The purpose of treating the upper jaw first will probably naturally present itself, however, suffice it to say, because of the opportunity the superior maxillary bone gives us to secure a firm base to which we may bring the teeth into proper agreement. The superior teeth once secured in place, the inferior teeth should be undertaken. The initial effort in these cases is to secure firmness of the teeth in their sockets; movement must be avoided if we hope to save any of them. After the teeth are tied, such scaling as may be indicated will be the next step. The pockets should be thoroughly but carefully investigated with proper instruments, all foreign matter removed from them and from about the teeth, having recourse frequently to a $\frac{1}{500}$ or $\frac{1}{1000}$ solution of $HgCl_2$ in H_2O_2. This preparation of peroxide should be used liberally, at first allowed to remain in the pockets and about the teeth for perhaps even three minutes.

The indication to suspend its use will be when the expectoration is clear or evidently free from pus. Where the teeth are elongated and resist longitudinal replacement, after they are tied in place, it may be found necessary to reduce their length to permit a proper occlusion to be secured. However, in this operation great caution should be used, as the entire contour of the face may be changed by injudicious shortening of the bite. The inflammation in the sockets inducing the elongation many times subsides after treatment for a few days, when it will be found possible to quite or nearly return the tooth or teeth to normal protrusion. Teeth may, however, be restored to their sockets nearly in their normal position by direct pressure, provided they are undertaken while loose, before regaining firmness after treatment.

The varying local medicinal treatment will be indicated by judicious observation from day to day, and is somewhat difficult to more than name in a general way. Remedies must be altered and also alternated as conditions present in individual cases.

For perhaps two weeks patients should be seen daily. Sometimes no application of medicaments will be indicated,—perhaps a little scaling or scraping of overlooked deposit from time to time; but the continued progress of the case will be insured by this constant attention at first.

The visits may gradually be interrupted from alternate days to twice a week and then weekly, until in perhaps the third month of treatment of a grave case fortnightly visits may be proper, which interval should continue until a satisfactory cure is established.

The appearances of the abnormal conditions seem to be best indicated by color, size, and texture.

A dark blue color of swelled and soft or spongy gum should be lanced to relieve the venous congestion, and then injected with aromatic sulphuric acid, full officinal strength. Should suppuration be imminent or present, evacuation of the pus by incision, or the injection of hydrogen peroxide, is a first step, followed by a delicate application of "caustic paste" (potassa fusa ⅔, acid. carbolic. cryst. ⅓). A cherry-red color of slightly puffed gum calls for salicylic acid solution saturated in 95 per cent. alcohol. A warm pink color and no increase in size indicates tannic acid, made into a thick paste with glycerine.

The mucous membrane should be carefully protected from these remedies, and they should be applied exactly and only where needed.

The constant exhibition of antiseptic and stimulant mouth-washes is a necessity, and their daily use should be insisted on.

The following washes are presented :

℞—Hydrarg. bichlor., gr. ij ;
Tinct. calendulæ, ʒ iv ;
Aquæ dest., q. s., ad. ℥ viij. M.
Sig.—As directed.

℞—Hydronaphthol, ʒ ij ;
Tinct. calendulæ, ʒ iv ;
Aquæ dest., q. s., ad. ℥ viij. M.
Sig.—As directed.

℞—Hydrogen perox., ℥ iv ;
Tinct. calendulæ, ʒ ij. M.
Sig.—As directed.

The hydronaphthol wash is especially recommended. Many cases soon reach a stage of progress indicating simply rinsing, syringing, spraying, or gargling with the hydronaphthol wash, which will be found a good prescription for permanent use as a prophylactic. Chas. Marchand's medicinal hydrogen peroxide is reliable, and harmless to normal tissue. It is specifically recommended.

What systemic remedies are indicated?

Tonics are specially indicated, alteratives sometimes. Cathartics in almost every case, especially in beginning treatment, will be found greatly advantageous.

Digestive stimulation is mostly needed, but the following seems to meet the vast majority of cases. At any rate it has stood the test of time, and has been one of the means that has brought success with every case remaining under control.

℞—Cinchonidinæ sulph., ℥ ss ;
Acid. sulph. arom., ℥ ij ;
Alcohol, 95%, ℥ iij ;
Glycerine, C. P., ℥ ij ;
Aquæ dest., q. s., ad. ℥ xv.
Sig.—One teaspoonful *ter die*, as directed.

If the patient complains of more or less pain in the back, general weariness, chiefly located at or near the loins, the following will be found beneficial:

℞—Potass. iodid., ʒss;
Aquæ dest., ℥vj.
Sig.—One teaspoonful *ter die*, as directed.

Alternate these prescriptions for two weeks; then, unless indications point to the contrary, leave off the iodide, replacing it with the cinchonidinæ. Keep the two prescriptions in use until a satisfactory cure is obtained. Many cases will not need the alterative (iodide), but it will be found all cases are benefited by the cinchonidinæ.

What mechanical means are indicated?

After the tying of the teeth in place, it may be found difficult to restrain them from elongation. This may be secured by striking copper caps made continuous and embracing all of the affected teeth, extending from the occluding surface of the crowns well up on their lingual or buccal surface, as the case may be, but the fixture should be in one piece, extending from firm tooth to firm tooth; sometimes more than one may be found approvable.

These copper retaining-caps should be bound to the teeth with copper wires, each separate loose tooth fastened firmly in proper position to the cap fixture, and the extremities of the fixture firmly tied to sound supports. Where the whole arch is affected, as many times occurs, and all of the teeth are loose, a continuous rim embracing all of the teeth will be found to give quite adequate firmness. To this all of the teeth should be bound, each separately, so as to insure its being retained in its own place in the fixture, and that it shall not be crowded out by untoward circumstances.

The capping of the occluding surface must, of course, be judiciously done. Undue interference with the bite would aggravate the condition, but judgment is necessary to undertake such a case of surgery, and naturally should be employed throughout its treatment. These copper plates may be left on with great advantage for a year or more, although they are noted here more especially as a temporary fixture, to be left on for say three months at the outside. They are objectionable only for their unpleasant taste, which may be greatly alleviated by a solution of bicarbonate of soda, one dram to four ounces of water, used as a mouth-wash. The writer has experience of a case in his father's practice involving an entire denture of thirty-two teeth, where, above and below, continuous rims of copper struck to fit, of varying breadths of about one-fourth inch and one-sixty-fourth of an inch thick, were left on for one year and three months, during which interval the teeth became attached firmly without any other treatment, although the case had been under treatment but a short time before placing the steadying fixtures. Also, during this interval the patient became a mother, and this without any serious aggravation of the disease, and probably would have remained out of sight indefinitely had not two of the wire ligatures broken away from one side of the upper fixture, allowing it to drop down. This plate was retained by six ligatures,—one on each second molar, one on each first bicuspid, and one on each central incisor. The discomfort of the plate brought about her return. The lower teeth were found to be in such good condition—firm in their sockets, hypertrophy subdued, no pus present, sensitiveness gone, occlusion not ideally but practically correct—that the copper plate was removed from this jaw and left off. The upper left first molar was still weak, slightly suppurating. The teeth were cleansed and the fixture drawn back to place without being separated from the other teeth and wired anew, and the molar put under treatment. There were no cavities found upon any of the teeth, notwithstanding this long presence of the plate in the mouth. It seems to indicate that the copper has a direct antiseptic action, as well as germicidal, and, perhaps, stimulant as well.

To return to a general consideration of the mechanical means within our reach. These would embrace bars built into the teeth (as advocated by Dr. M. L. Rhein), cap and other specially indicated struck retaining fixtures, which, if intended to be permanent, should perhaps be made of platinum, platinum and iridium, or gold, and should be cemented in place. Struck cap fixtures are advocated as best meeting the needs of these cases. A not usual mechanical retaining device, which could be associated with a regular retaining fixture or not, as the case indicates, would be pockets constructed for the reception of reproduced gum-tissue. These could include a sponge-graft where the loss of tissue is extensive. They should be made with removable windows, so that frequent examination of progress may be made.

What surgical means are indicated?

Distinctively surgical procedure means the employment of three efforts: 1, free lancing to relieve the venous congestion generally attending pyorrhea; 2, the removal of carious or necrosed bone, alveolus, root, or maxilla, one or all (this last, it is hardly necessary to say, should be by burring with the engine); 3, an aspect of surgical treatment that would require reproduction. For this, sponge furnishes a means of restoration entirely feasible when properly controlled, and efficient if intelligently managed.

CORRESPONDENCE.

THE GREAT DENTAL MEETING IN CHICAGO IN 1893.

BY WHAT NAME SHALL IT BE KNOWN, AND UNDER WHAT AUSPICES SHALL IT BE HELD?

TO THE EDITOR OF THE DENTAL COSMOS:

IT having been definitely settled that there is to be a World's Exposition in the United States in 1893, and that it is to be held in Chicago, there can be no question that dentistry will be represented there by a large meeting at that time. But the question is, What kind of a meeting, and under what auspices shall it be held? Shall it be a memorial meeting of the American Dental Association, a joint meeting of the American and the Southern Dental Associations inviting the dentists of the world to meet there, or shall it be an adjourned congress from that held in Paris in 1889,—"one of a series of dental congresses" that some have been working to secure for several years? If the latter, under what auspices is it to be held, and who is to have control of it, appoint its officers, lay out its work, and do whatever may be needful to make the congress a success and a credit to the country in which it is to be held?

If an adjourned congress is to be held in this country, thereby perpetuating the Paris congress, it is but fair to presume that the Europeans, who are always punctilious in regard to etiquette, did not adjourn to meet here without supposing that they had an invitation from the profession in this country to do so.

The International Medical Congress never adjourns to meet in any particular country without a formal invitation from some representative body of the profession in that country to do so. For instance, when the congress was held in Copenhagen, the American Medical Association, as well as the representatives from medical associations in other countries, presented formal invitations for the next congress to meet in their respective countries, and it was decided that the meeting of 1887 should be held in the United States. At the meeting of 1887 like invitations were received from different countries in Europe, and Berlin was selected as the place for holding the congress of 1890. It would seem, therefore, that the proper party to have invited the dental congress which met in Paris to adjourn to meet in this country in 1893, or at any other time, was the American Dental Association; but did it do so?

It was known that certain parties residing in the United States were very anxious to make the Paris congress a success and to secure its adjournment to this country, and made several trips to Europe for this purpose. That these parties were present at the meeting of the American Dental Association at Saratoga in 1889, and that they were anxious to have the association indorse the Paris congress, as well as to invite it to adjourn to meet in this country, is also well known. But there were also parties present at that meeting who, while they were perfectly willing that the Paris congress should be held, and wished for its success as a meeting appropriate for the occasion of the Paris Exposition, did not believe in the desirability of an adjourned congress being held in this country, thereby perpetuating it ; and not wishing to have the question sprung upon the association at a time when there might happen to be but few present, or when it was packed for the occasion, a resolution was offered that whatever action might be taken in regard to the matter should be made the special order at a fixed time on the following day, so that all might be present. When the time came, nearly every member was in his seat, and it was so evident that a large majority of the members in attendance were opposed to the Paris congress adjourning to meet in this country that those who favored it did not dare to make a motion to submit the question to a vote of the association.

Nevertheless, the Paris congress voted to hold its second meeting in the United States, at the time and place of the World's Exposition. Here the question naturally arises, Who extended an invitation to the congress to adjourn to meet in this country, and by what authority did he or they do so? Certainly this authority was never derived from the American Dental Association, nor was it done at the instance of the Southern Dental Association, the next largest representative body of dentists in the United States. Whoever gave the invitation did so without the authority of the profession of this country, and either he or they assumed a responsibility not delegated by the profession of America. But these men will say that the mayor of the city of Chicago requested them to invite the congress to adjourn to meet there, and that the president of the Auditorium Company authorized them to tender the use of a hall for the meeting. But is anyone simple enough to suppose that either of these gentlemen knew or cared anything about the dental congress of Paris, or would have extended an invitation to the congress to adjourn to meet in Chicago unless some one who was "working the scheme" went to them personally and asked them to do so,—and that, too, before it was settled that we were to have a World's Exposition in this country and that it would be held in Chicago? Certainly no one would assume that the present or any future mayor of Chicago, or the president of the Auditorium Company, had any authority or right from the profession of the United States to invite the dentists of the world to meet here in 1893. As a professional matter, this right rests either with the American Dental Association alone or jointly with the Southern Dental Association, and no individual, local society, or mayor of any city has the right to assume this responsibility, nor should such action be considered binding or be respected by the profession of this country. That it will be can hardly be imagined.

The suggestion of holding a memorial meeting of the American Dental Association at the time of the World's Exposition would seem to have some merit in it, and calls for careful consideration. This association undoubtedly, more than any other, is the representative body of dentistry in this country, as is the American Surgical Association the representative of surgery, or as the American Medical Association is the representative of general medicine. And should a memorial meeting as suggested be held, it is to be hoped that it will be conducted liberally, and without ring management, and that an unusually large number of dentists from the United States, as well as from abroad, will be present, and that it will be a reasonable success and result in great good. The suggestion of a memorial meeting has merit in it, and it should be carefully considered. But those who make propositions for this meeting should not be unmindful of the fact that the Southern Dental Association is a large and influential body of men. It takes in all that portion of our country known as the Southern States, and also includes in its membership some of the best practitioners in what is known as the Northern States as well. While it is known as the "Southern," it is nearly as national in its membership as is the American, and it will hardly seem right to the profession in the South if a great meeting of dentists is to be held in the United States at which the profession of the world is to be invited that it should be denominated a memorial meeting of the American Dental Association, and that it should be held under the auspices of and managed by that association alone.

The profession of the South is fully imbued with the idea that the World's Exposition of 1893, to commemorate the fourth century of the discovery of America, should be made the occasion of a great meeting of dentists in the United States. But the feeling is that that meeting should be of purely American origin, and managed jointly by representatives of the American and Southern Dental Associations rather than by the American Association alone, and also that it should not be an adjourned meeting of the Paris congress, or managed by or in any way controlled by the committee there appointed.

The Exposition itself is to be independent of any Exposition ever before held. It was conceived by and is to be managed by Americans. It originated in and is to end with the celebration of the four hundredth year of the discovery of America. On that occasion the United States proposes to exhibit the choicest products of her soil, mines, her multiplicity of machines, fabrics, and domestic animals, as well as of her art,—in a word, everything that marks the products or results of her civilization,—and she invites the different countries of the world to send here their choicest products for exhibition, that those of each country may be compared with those of other countries, to the end that the world may be benefited by what may be here done and seen. No more fitting occasion for a great dental meeting can possibly be conceived, and that it should be held in Chicago no one will question. But, like the Exposition, let it originate with and be managed by citizens of the United States. And as it is to be a dental meeting, let it originate with and be managed by the representatives of the two great dental organizations of the country, and let it be organized by committees appointed by these bodies, rather than have its origin in a meeting held in some other country and be organized by a committee there appointed.

The United States is to manage the Exposition, and let the dentists of the United States manage and control any dental meeting that may be held. Let them organize and conduct it and foot the bills, and invite all reputable dentists throughout the world to come here as our guests without the payment of membership fees. All that should be asked of them is to bring with them their best thoughts and exemplifications of their skill to be compared with ours ; that the science and practice of dental and oral surgery may be improved to the end that human suffering and inconvenience may be more readily relieved as well as prevented.

When this meeting is held, let there be no dental politics in it nor scheming for personal or clique ends. Let the committees appointed from the two associations be so fair and large-minded that they will forget and ignore all personal differences, and let the meeting, by whatever name it may be known, be organized by men who have only the advancement of dentistry and the benefit of humanity at heart. Should this be done, we will have a meeting that ought to be harmonious and of which dentists throughout the world may well be proud, the influence of which for good will be felt for all coming time. But if the management of it is assumed by the American Dental Association alone, the profession in the South will feel that it has been unjustly ignored, and if its management is assumed and controlled by a committee appointed by the Paris congress, it will certainly lead to such dissensions and wrangling as will prevent a large proportion of the self-respecting and better class of dentists from taking any part in it.

Let me appeal, therefore, to the representatives of our profession and our two great dental associations, as well as to every dentist in our great country who has the good of his profession at heart, to clasp hands on this question and put the management of any meeting we may have in the United States in the hands of a joint committee that may be appointed at the next meetings of the Southern and American Dental Associations, and ask them "with malice toward none and charity for all" to take such action as good sense shall dictate, and the occasion, which will never come to us again, may demand.

TENNESSEE.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, May 13, 1890, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. J. F. P. Hodson, in the chair.

Dr. M. Charles Gottschaldt read the following

CLINIC REPORT.

A stated clinic of the society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street. The number in attendance was eighty-three. Six very interesting clinics were given. Dr. George A. Maxfield, of Holyoke, Mass., demonstrated his method of treating pulpless teeth. The case was a first upper molar in which the pulp was alive. The cavity was washed out with peroxide of hydrogen, followed by bichloride of mercury 1 to 250. It was then dried and a 10 per cent. solution of cocaine applied and the pulp extracted. The canals were drilled out with extra short drills for the right-angle hand-piece and a solution of iodoform in eucalyptol was put into them, and they were then filled with gutta-percha points. . . . Dr. E. S. Niles, of Boston, Mass., showed Small's thermo dental obtundent, the action of which is dependent on the evaporation of alcohol. The apparatus consists of a hollow hand-piece, having on one end a receptacle for the alcohol to be evaporated and beneath it a lamp to heat it; on the other end is a small point from which the alcohol vapor escapes. This point is shaped so that the spray can be directed to any desired spot. The obtundent effect on sensitive dentine is obtained in from five to fifteen seconds. The working of the apparatus was satisfactory. Dr. Niles also exhibited another very ingenious apparatus, the thermo appliance for relieving inflammatory conditions. Any desired temperature can be obtained. It is intended to take the place of capsicum bags, etc. . . . Dr. George H. Winkler, of New York, filled the posterior approximal surface and across the entire crown of a first upper molar with a combination of tin and gold. Tin was used in the approximal cavity where the pulp was nearly exposed, and gold in the crown cavity. Smooth points were employed in the filling, and when it was nearly completed the doctor removed the napkin and allowed the filling to get wet ; the napkin was then replaced, the saliva wiped off, and the operation completed, the gold welding perfectly. By using smooth points and cohesive gold the doctor claims this can be done in every instance. Three-quarters of an hour was spent on the operation. The second operation was a crown cavity in a lower molar, which was filled with non-cohesive Quarter Century No. 6 foil in about six minutes with the aid of the J. D. White plugging forceps and biting instruments. In using soft foil the doctor depends upon dovetailing and not on interdigitation. . . . Dr. Charles G. Pease, of New York, demonstrated the use of amalgam wafers, and gave the following description : "The wafer is made by enveloping a portion of freshly-prepared amalgam in a fold of chamois skin and squeezing it hard, employing large, strong pliers made for the purpose. The method of using is to place a wafer upon a filling of ordinarily mixed amalgam which has just been inserted in a cavity, and crushing it into powdery pieces by tapping until it is thoroughly incorporated with the main filling and becomes a homogeneous mass. In large cavities a wafer is applied or added when half the filling is introduced, a second wafer being placed on the surface at completion. In contouring and building entire crowns wafering is of great value, hardening the amalgam as the work proceeds. This process is also useful to increase the consistency of amalgam which has been inserted soft for some specific object, as prevention of pulp-irritation or of too severe impingement upon exquisitely sensitive or much decalcified dentine. In introducing the fillings, tapping with light blows from an appropriate instrument will be found to place the filling in more perfect apposition with the walls of the cavity than the process of rubbing, and a better union of the various pieces used is secured. It is claimed for this method that by it the setting of an amalgam filling is hastened, the spheroidal tendency lessened, and the edge strength, density, and whiteness of the filling much increased, and that too severe pressure upon frail walls is avoided." . . . Dr. S. S. Southworth, of Sacramento, Cal., demonstrated the use of his flash lamp for the restoration of pitted, moistened, or broken gold fillings in any location in the oral cavity. The surface of a filling which has been in contact with moisture is filed or burred off, and a concentrated alcohol flame from the flash lamp directed upon the freshly-exposed surface, and the restoration in gold proceeded with. . . . A patient complaining of sore mouth of some months' standing, for whom all the upper teeth had been extracted and who wore a denture, was brought for advice. A small opening presented in the front of the mouth near the median line, through which a hard edge could be felt. Dr. W. H. Atkinson diagnosed it as a case of necrosis of the anterior plate of the ridge. Dr. Maxfield concurred in the diagnosis. Removal of the necrosed portion was advised. . . . Dr. E. Parmly Brown showed a new porcelain crown with double screw or milled shank or series of rings equivalent to screw-threads, giving greatest strength with least amount of metal, and the pin being ready to insert in most cases without filing ; also least amount of metal in the crown to retain translucency. . . . Dr. J. Albert Kimball presented for advice a young lady of seventeen with crowded anterior section of inferior arch. The incisors have assumed the familiar fan-like appearance, the right cuspid is crowded out of line, occluding outside the upper teeth ; the left cuspid is twisted and deflected into an unusually oblique position. The case was examined by Drs. Hoyt, Brown, Luckey, Jackson, Metcalf, Merritt, and many others. Nearly all who expressed an opinion at first recommended the extraction of one or both the second bicuspids, but after considerable discussion it was almost unanimously conceded that it would be better to extract the left central incisor. The apices of the incisor roots being crowded closely together, it was believed that after such extraction the remaining incisors could be brought together so as to occupy a vertical position, the right cuspid drawn into its proper place, and the obliquity of position of the left cuspid nearly or quite remedied. Dr. Kimball also exhibited a simple receptacle for soiled pellets used in drying cavities, applying dressings, etc. It is a semi-transparent glass jar with a metallic cover, in the middle of which is a star-shaped aperture with the central points turned down at right angles to facilitate detaching a pellet from the tweezers. This contrivance is intended for the bracket-table. It seems well adapted to prevent a litter of dirty pellets about the dental chair.

Dr. Maxfield. Mr. President, I would like to say in regard to the clinic this afternoon, that with my method of treating pulpless teeth it is not necessary to apply the rubber-dam. The first thing of importance is to have the mouth in an antiseptic condition ; and to accomplish this I have the patient rinse the mouth thoroughly with an antiseptic mouth-wash ; I also use this wash for syringing out the cavity and canals during the operation. This mouth-wash contains menthol, thymol, eucalyptol, gaultheria, and hydronaphthol, and is one that I make for my patients' use at their homes. In this mouth-wash I depend upon hydronaphthol as the antiseptic ; the other ingredients are simply used to modify the taste. I have endeavored to make a mouth-wash that would be as pleasant to use as listerine; while I have not quite succeeded, I have made a very near approach to it. Another point: before attempting to remove any of the pulp, I deluge the cavity with peroxide of hydrogen and bichloride of mercury. I use a solution of bichloride 1 to 250, and equal parts of the peroxide. I want this disinfectant to always advance ahead of the instrument, both into the pulp-chamber and canals. I am not particular about removing all of the dead pulp from the canals with broaches, etc.; in fact, I care nothing about it. I get out what I can with my hooks, then with a Gates-Glidden drill I ream out the canals, taking care that the canals are saturated with the peroxide-bichloride solution all the time I am using the drill. I was very much amused, a short time ago, on reading a report of one of the society meetings here in New York, in which one of the gentlemen spoke of introducing a few drops of peroxide of hydrogen and pumping it up through the canal, and stated that he feared the ill results that occurred afterward were caused by the peroxide. To me it was like throwing a teaspoonful of water on a big fire, and saying, because the fire burned fiercely afterward, that it was the teaspoonful of water that caused it. The ill results which he claimed came from the peroxide were simply the results of the infection, and not from the peroxide. If he had used enough of the peroxide to thoroughly wash out the canal, it would probably have been all right. In drilling out the roots of molar teeth it is necessary to use a right-angle attachment; I have found that the drills as furnished by the depots are too long, so I have had made for me by The S. S. White Co. drills that are one-fourth of an inch shorter than the regulation length. I will pass some of them around.

A very important thing is to have a good solution of peroxide. I have found nothing equal to Marchand's peroxide of hydrogen. Mr. Marchand has recently gotten out a new pamphlet on the subject of peroxide of hydrogen; I have a few here, which I would be glad to have you take with you. It gives a great deal of information in regard to peroxide of hydrogen that is not generally known. I always buy a pound bottle, and in cold weather keep it outside on the window ledge and let it freeze solid: when I want to use some I take it in and thaw it out. In warm weather I keep the bottle at home in the refrigerator, and only have an ounce or so at the office, as it rapidly deteriorates if allowed to remain in a temperature above sixty degrees.

Dr. E. S. Niles, of Boston, exhibited and described the thermo dental obtundent and the thermo appliance for general use in place of the ordinary hot-water bags and stimulating appliances, which were shown at the afternoon clinic.

Dr. Southworth. Mr. President, I feel some delicacy in appearing here. I am introducing in the market an article to facilitate restoring of gold fillings in the mouth. I have been using it for three years. It is a flash lamp for concentrating a flame on the gold in the mouth. You place the rubber-dam on the tooth, dry it, and roughen the surface of the filling with a bur or file, then apply the flame from the lamp. The same thing can be accomplished by winding cotton around a toothpick, saturating it with alcohol, and placing it lighted in contact with the tooth. No retaining-points are necessary, and you can build on a flat surface. It saves labor. There is a difference of opinion as to whether the surface of the gold filling is annealed, or whether the object is accomplished by thorough drying of the surface. I have not given the matter sufficient attention to decide that point. One gentleman says he cannot conceive of the gold being annealed without it becomes cherry red. Another claims that it cannot be done at a lower temperature than 600°, which would be impossible in the mouth. Whether the gold is annealed or not I do not know, but I do know that in practice this method has been very successful. I believe I have not met with a failure. It can be applied in any place where the flame will ascend in the mouth—the flame from an alcohol lamp that will come in contact with the gold. If any gentlemen present have tried it, I would like to have the results of their experience ; it would be of some value to me.

Incidents of Office Practice.

Dr. Reese. Mr. President, I have here a practical case which may be of interest to those present. It is an old plate made on my metal base which has been refitted to a new model. Things of this kind have been done before, but I doubt if with as much accuracy in the perfect joining or union on the new model. In the fitting of old continuous lower plates, where the gums have shrunk away, I have used this process with much success. I first take an impression, and after obtaining the model varnish it with shellac and oil it, put on the plate, and flow wax around it so that it is perfectly adapted to the new model. I then try it in the mouth to see if it fits perfectly. It is then sealed up and kept at an even temperature while casting. In this way only is it possible to prevent the porcelain gums from cracking.

Gentlemen, here is a little thing, an artificial eye. You will say that is rather out of our line ; but as the eye specialists have treated their subjects so step-motherly, I thought it would not be amiss if we would do a little something for them. The artificial eye is in most cases the cause of a great deal of worriment and annoyance, and in many cases causes the loss of the other eye. The irritation is kept up constantly, and to my knowledge nothing has been done by the eye specialists to prevent it. I have spoken to a couple of physicians in regard to this matter, and they say they have nothing to do with it. I think it would be the same if we were to ignore those poor people who have lost their natural teeth. This is about the way the eye is made [showing specimen], then it is fitted to the cavity by grinding. Now, that grinding and fitting makes it still more irritating. The glass eye is a non-conductor. I have made experiments to see if I could frame the edge of the artificial eye with a rim of gold, which in the mouth is such a fine agent, and have also experimented to see if it was possible to cast a metal rim around that fine, frail little shell without breaking it, and finally succeeded in controlling the process in such a way that I can do it without cracking this glass shell. I have had a very excellent subject in a lady who found it almost impossible to wear an artificial eye; and the benefit that has resulted inside of two months is surprising. The lids were sloughing, and the patient could not close them over the artificial eye nor close them when the artificial eye was out; and on account of the muscular condition the artificial eye would drop out frequently, even when laughing, and there was considerable mucous discharge. There has been a great improvement in the two months she has worn the eye framed in this way; she can now close the lids completely over it. Before, the irritation was so great that the whole side of the face would be very sore. The last time she went to her physician, he said he did not think he could do anything more for her. I had called on him and asked him to give me a subject to try this method on, so he sent this patient to me, and the lady is absolutely delighted with the result. I had almost abandoned the idea, when about three months ago an old gentleman came in my office and told me a somewhat pitiful story, that by wearing an artificial eye he had lost the other good eye, and I then determined to see if my idea could be practically carried out for his comfort. So I have tried it, and the success is excellent, and I thought it would interest the gentlemen here to see what I am doing. I think every one here will acknowledge that it requires very fine manipulative powers to do such beautiful work.

The president introduced Dr. Horace Dean, of Jersey City, N. J., who read the following paper:

Taking Impressions.

The tendency of the profession at the present is undoubtedly in the direction of dental science and art preservative rather than restorative; to retain usefully the natural organs rather than to replace with artificial substitutes. This is unquestionably right, and if all patients were wise in due season and all dentists supremely skillful, this course would make us masters of the situation, and the tooth carpenter would die from natural causes. But, unfortunately, those golden days have not yet given signs of dawning, and the dental artificer is still abroad in the land. Is it not, therefore, wise for us to strive earnestly after perfection in our artificial department, and so long as we must needs supply a demand to aim to do it as well as may be? With a view to helping in this direction, I bring to-night my small contribution on the subject of taking impressions. You will all agree with me that there is nothing more essential to success in any undertaking than a right start. In the construction of artificial dentures it is certain that a true impression is of prime importance. To get an exact copy of the human mouth is by no means an easy matter. The different conditions that make the situation are often so adverse that we are frequently tempted to give up our efforts and say let the cheap dentist take the trouble and gather in the shekels and the glory. The mode of procedure which I shall suggest to you will, I think, lessen somewhat the difficulties of the operation and help to give more exact results. The material for taking the impression should be of such a nature as not to press out of position any of the parts of the mouth of which we desire to obtain a copy. This is at variance with the teachings of some eminent operators, but I think it is more exact to take the impression truthfully and then carve it and the model to suit the conditions revealed by a careful examination of the mouth. After the material has taken an impress of the parts, there should be absolutely no change possible in the removal, for if there is your impression is untruthful, and you have no means of knowing its extent nor the power to correct it. In my judgment there is but one material known to us to-day which meets the requirements of the two principles which I have named, and that is plaster of Paris. If of proper consistence and rightly manipulated, it will not displace the softest parts, but will truthfully take their impress. In the removal it does not bend out of shape by slightly adhering to the roof of the mouth, nor draw into straight lines, as the wax compounds will always do to a greater or less extent; but as it cannot bend, it breaks with a sharp, clean fracture which leaves exact edges to be rejoined. For these reasons I always use plaster of Paris for all kinds of impressions.

In describing my process we will begin with a partial upper case. The first step is to get a wax impression with the teeth as nearly correct as may be. In this cast a plaster model, using salt or potash to hasten the setting, and separating as soon as set, for the heat generated by the quick setting will have so softened the wax as to render the separation easy. In this model place a sheet of wax, and have it cover all portions corresponding with the parts of the mouth of which you wish a copy. Let the wax cover the palatine surfaces of the plaster teeth, but not the grinding-surfaces. In the spaces between the teeth let the wax be quite thick. On this wax plate place a piece of ordinary wire mosquito netting, which carefully adapt so that it covers and touches the wax and the grinding-surfaces of the teeth. Next, in the usual way, coat with separating fluid (I use pure glycerine) the parts of the model not covered with the wax, and place a coat of plaster over the wax and net, being sure that it covers the grinding-surfaces of the teeth and a narrow space at the back of the wax plate. When this has hardened, separate and remove the wax, and you will have a shell of plaster stiffened and held firmly by the wire net. This shell closely approximates the shape of the mouth, and will carry the plaster of your impression to just the part you wish to copy and nowhere else. When you are ready to take the impression, try the shell in the mouth and trim till it goes easily into place and rests firmly on the ends of the teeth. Then soak it in water to make it more comfortable to the mucous membrane, and also that the impression plaster may stick to it. Next fill the shell with plaster mixed in the usual way, and place in the mouth, pressing up until it rests on the ends of the teeth. You will find that the plaster, while flowing easily and accurately to all parts inside the arch, will not be on the outside of the teeth, and consequently it will be quite easy to remove the impression by pressing down on the two sides of the shell.

For a full upper case you take an impression in wax, being careful to have the wax press as high as possible on the gum. By at once casting a model and hastening its setting, you can retain your patient till the model can be compared with the mouth. Mark on the model the places where the edges of the shell can rest firmly. Then construct the shell in the same way as for partial cases, letting it go as high as possible on the gum. In taking the impression you simply press up till the shell rests firmly on the parts intended, and the plaster flows inside the shell and is not disturbed by any tremor or movement of the hand of the operator. In removing the impression it will be necessary to lift and draw the side of the mouth so as to admit air between the impression and the roof of the mouth, when it will easily drop.

Partial lower impressions have always been a matter of great trouble to me, and I believe to others, especially where there is much undercut or where the teeth lean in a good deal, or both together. It is only within a day or two that I have been able to think out an adaptation of this system to such cases, and it is still largely a matter of theory. I will give you my ideas on the subject, so that we can all work at it and perhaps obtain something that will be of general benefit.

In such a case, after getting a model of the lower jaw from a wax impression, I should trim to as close an approximation of the mouth as possible and then prepare the shell in the same way as for a partial upper, excepting that I should leave a portion of the wire net just back of the front teeth uncovered by plaster for a space of perhaps a quarter of an inch in width, and extending from the cutting-edges of the teeth down to the floor of the mouth. This forms a hinge which will allow the free ends of the shell to be pressed toward the tongue, and so make it easy to carry the plaster down over the crowns of projecting teeth. When down to its place, press the sides of the shell laterally against the teeth and hold till the plaster is set. Of course, by this time the plaster of the impression covering the hinge has also set and made that portion rigid. If, now, you can easily remove the shell and its contents, do so. If not, again press inwardly the free ends of the shell till the plaster over the hinge is broken and the sides are clear of the teeth, then remove, and by pressing the shell outwardly till the fractured edges are touching, the impression is restored to its truthful position.

In my hands this system of taking impressions has given uniformly good results, and I hope that you may find in it sufficient merit to work it out and improve still further upon what I have suggested.

The wire netting has a valued place in my laboratory. I use it in making trial-plates, putting it between two thin sheets of wax, which it makes very stiff. In mending or in making slender plaster work, a piece imbedded is a great strengthener, and even if the plaster breaks the parts do not part. There are two grades, fine and coarse, which gives a variety suitable for different conditions.

Discussion.

The President. Gentlemen, this very practical paper is open for your discussion. We would be glad to hear from any gentleman present.

Dr. Reese. Mr. President, I think the model is very good, and very useful to anyone who can follow Dr. Dean and understand his ideas. As far as the wire occlusion plate is concerned, I advised that years ago and took some samples to the S. S. White Company to manufacture, but they did not think it advisable. But I must say it is the only occlusion plate with which it is possible to get a correct occlusion in certain cases. My way of taking impressions to-day is somewhat more simple. For a full upper case I proceed as follows: After selecting my impression-cup of the right size, I take it into the laboratory and drill a hole through the floor of it, and then put a rim of wax all around the cup, making a ridge in the back so that the plaster shall be retained and not forced down into the throat. The rim of wax that I build inside of the impression-cup holds the plaster in contact with the buccal and labial surfaces and prevents it rolling off. On the floor of the impression-cup where the opening has been made I put a little sheet wax, and of it I build a reservoir, so that in a case where the patient has a small mouth and a very deep arch, after I have put the impression-cup in place, I manipulate with the fingers underneath that wax reservoir and so force the plaster up, and it gives a very accurate impression. I hold it there about four minutes. I have found that where otherwise the suction would be very insufficient it has proved by this method very good. In partial sets, where there are overhanging teeth, it is difficult to get a plaster impression (and I agree with Dr. Dean that that is the only material fit to take a good impression) ; I take my impression-cup, melt a little wax all over the inside of it, upon which I place other softened wax, and heat it so it sticks to the impression-cup ; then take as accurate an impression as the wax will give. That is cooled in water and the wax removed wherever I want the plaster to go through a hole or channel. Then I make of soft wax a reservoir ; I then try it in. Then I fill in the plaster, having the reservoir full, and having none where the remaining teeth fit in, and take my impression as before described. This method gives a beautiful sharp impression in those difficult cases, almost always perfect, without breaking. With the permission of the society I shall be glad to demonstrate this at one of your clinics.

Dr. K. C. Gibson. Mr. President, I would like to state that most of the methods described meet my approval, and I fail to see how it would be possible for me to criticise them. They are without question simple and practical, and I am delighted that neither of the speakers has mentioned the impression material which a great many dentists resort to instead of plaster of Paris. I have been brought up on plaster of Paris. I assure you, gentlemen, I am pleased with the practical points you have given me this evening. I have had some little experience in taking impressions of fractured jaws, also of fissured palate, and if I could have heard this paper and the discussion twenty years ago it would have saved me a great deal of trouble, worry, and anxiety.

Dr. R. M. Sanger. Mr. President, I want to thank Dr. Dean for that portion of his paper especially which refers to impressions of the lower jaw. It has, I think, solved a very vexatious question. We have had provided for us by the trade cups made in sections, and various other devices by which to take a lower impression, and yet we have frequently presented to us mouths in which it is absolutely impossible to draw a partial plaster impression by any method known to us heretofore. Dr. Dean gives us to-night a method by which we may take an impression of the lingual side of the mouth,—the side that we want,—and dispenses with the labial side, which is unnecessary for our purpose, and I want to thank him for it.

The President. Gentlemen, Prof. James B. Wilmott, of Toronto, is with us to-night. We will be very glad to hear from him.

Dr. Wilmott. I am very glad of the opportunity to meet this society to-night, and I have been very pleased to hear the paper of the evening, especially since I have learned that Dr. Dean is a fellow-countryman of mine, and was a student in the same office and at the same time with myself, and that we have not seen each other since until this evening.

The subject of the paper is one of very great importance to all who take an interest in prosthetic dentistry, and the methods described by Dr. Dean and Dr. Reese seem to comprise the most important principles which we must have in view if we desire to secure perfect impressions. The pressure of the material against the parts without sliding is what we want, and what is in many cases so difficult to attain. The particular excellence of these methods seems to be in the fact that they provide for a direct pressure against the parts without a sliding motion, which must secure a more accurate impression and distinct line than could otherwise be made. I have listened to the paper and the discussion with great interest ; I have learned something, and got an idea which I think I shall be able to carry out in practice.

Dr. A. G. Bennett. Mr. President, I have given much attention to this subject, and have tried almost all of the published methods, as well as several of my own. I am much pleased with Dr. Dean's method ; but we often meet with obstacles that this does not quite overcome. As we all know, the dovetail *inter-dental* spaces are the points of greatest difficulty. I have lately struck a method by which the most difficult partial impressions are greatly simplified.

I had a very bad case, requiring the two laterals and a bicuspid, all the palatal surfaces being very bulging. I tried several of the usual methods, and failed. The question then occurred to me, Why not obliterate these spaces *by the teeth required ?* So I first selected the teeth and ground them up, and after drying the adjoining surfaces I waxed them in place with hard wax. I readily took the impression, afterward removing and placing the teeth in their positions. As you will see, this method requires no articulating out of the mouth, simply putting the wax plate in position and flasking the case. This week I took an impression of a very difficult case for the two laterals, the other teeth being much denuded at the necks. I ground up the teeth and simply sprung them into place, no wax being needed, and then very easily took a most perfect impression.

The advantages of this method are obvious. Besides dispensing with articulating and trying in, you can see exactly how the teeth are as to size, shape, and shade, and they cannot move out of place, being securely fixed by the impression.

I would not recommend this method for universal adoption ; it is chiefly for difficult cases ; and in such I have found not only nothing better, but nothing half so good. It is especially applicable where there are small spaces. Where there are spaces articulating three or four teeth, it is not so good. I have used it with gum teeth and plain teeth, but it is better for the latter. I set them as firmly against the gum as possible. They can be removed afterward, trimmed a little, and set up still higher by having them a trifle long at first.

Dr. Gibson. Mr. President, during the last fifty or more years the men who have constructed appliances for defective palates have spent a great deal of time in telling how you must take an impression, and that it must be accurate or you cannot perfectly adapt the appliance. I also wish to state that during the last ten or twelve years I have constructed a great many obturators, or so-called artificial palates, without taking an impression of the fissure of the soft palate. I merely take an impression in plaster of Paris of the hard palate, the same as you would for artificial teeth, and then make a plate with an extension of gold projecting into and above the fissure. I then model around this extension a preparation of wax and paraffine until I have constructed my obturator and have obtained its length, width, and thickness. The soft palate being movable, I found it impossible to take an accurate impression of the fissure and adjacent parts suitable for the construction of an obturator out of hard rubber or metal, so I have finally abandoned all efforts to take impressions of congenital and acquired lesions of the soft palate. I merely mention this to show that if you have a case of that kind requiring an obturator there is no necessity of wasting your time in trying to take an impression of the fissure and needlessly torturing the patient, for an obturator can be constructed by modeling in wax around an extension plate, which will cause little or no irritation during the modeling or in the wearing of the appliance.

Dr. W. H. Atkinson. We have had a very beautiful description of a mode of taking an impression and occlusion by the use of wire gauze filled with wax to secure in position the plaster impression into which it sets, and acquires at least an approximate if not a perfect model of the mouth. It has not been my forte to work in that direction, only so far as the principle is involved. I rejoice in the knowledge that the wholesale extraction of teeth, and many times sound teeth, making a clean sweep, is passing out of fashion ; and we are beginning to learn that there is a value in one or two sound teeth properly set in the jaw as guides, and it is not always good practice to extract even pretty badly loosened teeth. I have a case that has been of great satisfaction to me and to the patient,—and we have no satisfaction in our practice that does not benefit the patient. The case I refer to was sixteen years ago,—a right superior first molar; the palatal root was bare to the end, and it was a matter of doubt whether we should extract it or not. I had Dr. Reese make a device of his base to retain it. I saw it Monday, and it was there and doing good service at that time. I am not able to say whether the pulp is living or dead, for I had not hardness of heart enough to go over the end of the root, which I could easily have done, because it was covered only with a good and healthy gum. I say this to encourage the men of conservative intent. First secure a sound condition of the organs of the human body, and prevent deterioration by treating them hygienically. We have not got quite far enough for the medical men to think that dentists know anything about prophylactics, but they are coming on nicely, and learning to regard a dentist as something more than a tinker. When you watch these collisions between dentists and physicians, you find that the dentist always comes out ahead by some means or other, no matter how big an ignoramus he may be, if he has the sense not to transcend the line of his duty. When one has failed to secure a good natural denture, the next best thing is to supply the lost substance. If there is part of a tooth, fill it; if there is loss of teeth, supply them, even though it should be but one, and do not attempt to disturb a good occlusion. A good occlusion should never be disturbed, even though it be irregular. I think some people are more beautiful with their teeth higglety-pigglety, if they stand where they are doing more service than they would if they were more mechanically regular. I am asked what I mean by a good occlusion. I do not mean a good articulation. Occlusion means a striking together; articulation means the jointing of sound, as in speech: it is the clipping of the elements of words and sentences. That is the difference. I think that definition would hold in even the old dictionaries. I have had many quarrels with the dictionaries since dentistry came into the field and brought with it a knowledge that is so perspicacious the world all over.

Dr. E. A. Bogue. The gentleman has spoken of a bad occlusion. I wish I knew or that some gentleman would tell us what it is. Perhaps Dr. Atkinson can still further enlighten us. I would be very thankful if he would. If this is a good occlusion, what is a bad one?

Dr. Atkinson. I call that a good occlusion where the teeth are in a normal position, and so that each lower tooth, with the exception of two, strikes two upper teeth, and strikes them in a specified manner, according to the number of cusps that they have and according to the form of the tooth. That is a good occlusion. An occlusion is sometimes bad and sometimes very bad. What was in my mind when I said I would not disturb a good occlusion of irregular teeth was that I have seen many sets of teeth that did not fulfill our idea of a normal occlusion, that were, nevertheless, doing good masticatory service. I would not run the risk of disturbing the calcigerous matter of the bony sockets of these teeth by regulating, doubting whether we would ever get it so well again. The lime-salts of the sockets must be melted before you can move teeth with satisfaction, and after you have them in the desired place you have to hold them in position until the hardness and consolidation of the reverse action of melting shall have brought the sockets into sufficient density as to hold them in their places.

Adjourned.

B. C. Nash, D.D.S., *Secretary.*

Errata.—Dr. V. H. Jackson wishes to correct an obvious inadvertence in his paper in the April issue, page 289. In fourth line from top substitute masseter for "mastoid," and same correction in third line of explanatory note, Fig. 1.

AMERICAN MEDICAL ASSOCIATION—SECTION OF ORAL AND DENTAL SURGERY.

The forty-first annual meeting of the American Medical Association was held at Nashville, Tenn., commencing Tuesday, May 20, and continuing four days. Washington, D. C., was selected as the place for the next meeting, which will be held on the first Tuesday in May, 1891.

First Day.

The Section on Oral and Dental Surgery met in the lecture-room of the McKendree Church at 3 P.M., Dr. J. L. Williams in the chair. In his annual address he congratulated the profession upon the advances made in the past year relative to the etiology and correction of oral deformities, to antiseptics, in the knowledge of the effects of naso-pharyngeal growths, and in histology, in which pending researches promise still further advancement.

In chemistry and in ethics there have also been advances, though in the latter there is room for further progress. But as of the utmost importance we must regard the increased knowledge of the laws of health and disease, on which is based all intelligent practice in every branch of the healing art. Whoever is best prepared with knowledge of the laws of life, health, and disease will find his practice most successful.

It is to be hoped that dental colleges will give increased attention to the teaching of fundamental principles. So far as mechanics and chemistry are made therapeutic and prophylactic aids in securing health to mankind, in so far do they become enabled beyond their ordinary application to inanimate things.

At this day, when the knowledge of medicine and surgery is more general than formerly, and more commonly made available in the treatment of the oral cavity, and with reference to the influence of the health of the mouth on the health of the system, the term dentist seems to be too limited. He suggested the substitution of the words "oral," "orist," and "oristry" for the words dental, dentist, and dentistry.

In regard to the treatment of diseases of the teeth and allied parts by the general practitioner, Dr. Williams said that it was the bounden duty of a physician to treat every disease which came to him to the best of his knowledge and skill. If a case for special practice comes to him and a competent specialist is available, he naturally feels that he is doing his best by referring the patient to the specialist ; but if such special treatment is unattainable, he is bound in honor and by the common law to do the best he can for his patient. In the legislation of the different States, two at least recognize this obligation in their statutes, but some State enactments contravene the aim of all humane and proper practice, and prohibit a physician from doing anything in our specialty except that for the doing of which he may become legally liable for damages. (He referred to the clause in the dental laws of many States providing "that nothing in this act is to prohibit a physician from extracting teeth.") Special statutes cannot properly prohibit a physician from doing his best for the benefit of the patient, whatever may be his ailment.

Discussion.

Dr. J. Y. Crawford said that the practice of extracting teeth by physicians was in his opinion wrong ; that extraction should be resorted to only when there was no possibility of saving the tooth. He thought that to extract teeth and thus break up the dental arch was a serious calamity to anyone ; that more harm and loss was inflicted on the race by this than by any other form of malpractice. In fact, the sum of all injuries done by all other improper surgical operations is small in comparison to the injury which the people suffer by the loss of salvable teeth. The extraction of a tooth by anyone who is not able to judge of its salvability is an outrage.

Dr. Talbot said that the American people do not realize the harm that has been done by the needless extraction of teeth. More of it has been done in the last twenty or thirty years than ever before. He had made many careful examinations as to the state of the teeth in large numbers of people, and had found that even among the better class of people—those who try to take care of their teeth—a very small proportion retain the dental arches unbroken up to adult life. The consequence is that the usefulness of the teeth for mastication is crippled, and as many as fifty per cent., perhaps, of adults will be found to have abnormally small superior maxillary bones, evident by a depression at the alæ of the nose. The upper jaw contracts because of the loss of the teeth, and alters the expression of the face. The lower jaw remains normal in size because it is movable, and the exercise of mastication and speech develops it. The upper teeth closing over the lower ones are pushed out and extend forward so as to cause the upper lip to protrude ; the teeth being hard do not wear, but the alveolus, soft and yielding, is distorted and poorly developed. The extraction of the first permanent molars is especially liable to lead to this deformity, and these are the teeth that are more frequently than any others unnecessarily extracted. Indeed, some dentists make a practice of extracting these teeth in all cases which come under their hands. The extracting of these teeth generation after generation will result in a modification of the maxillæ. In fact, this result has been already reached. He could prove that the superior maxillary bones of the present generation are growing smaller. By examining the jaw-bones of people buried from four to eight hundred years ago we will find that they were on an average five-sixteenths of an inch larger in both diameters than those of people living to-day. One of the principal causes of this difference is the promiscuous extraction of the teeth.

Dr. Crawford said there was justice in ascribing the lessened size of the jaws to extraction of the teeth, but the failure to use the jaws as much as we should is another factor. The neglect of function will lessen development of any organ, and should be taken into consideration. While on the subject of extraction he desired to state that in his opinion it is also responsible for many diseases of the gums and alveolar processes, such as alveolar abscess and pyorrhea. He thought that teeth should always be extracted in pairs ; they came in pairs, and if it was necessary to extract one tooth it would be advisable to extract the corresponding tooth on the other side.

Dr. H. W. Morgan said he wished to emphasize the fact that the extraction of a tooth always interfered with the usefulness of the denture ; the remaining teeth always moved up more or less to fill the space left, and the articulation was deranged. He called attention also to the necessity of preserving the deciduous teeth until they had fulfilled their function. Their value is not properly appreciated by parents, physicians, or dentists. They should never be sacrificed while it is possible to save them.

Dr. Talbot said that he also wanted to impress the importance of saving the temporary teeth upon those present. If the temporary molar is extracted, we will find that the premolar will work forward and destroy the proper articulation of the teeth. If you will take models of jaws from which the temporary molars have been extracted, you will find that the permanent teeth are from one-thirty-second to one-fourth of an inch too far forward. If only one has been extracted the one side will be found so, while on the other side the teeth will retain their position. The power of the jaw is so great that unless the teeth antagonize properly they will be constantly forced forward, for the shape of the crowns and the movements of the jaw both tend to force the teeth forward, and when these molars are forward of their proper position they cause the anterior teeth to project. This is one of the local causes of irregularity of the teeth.

Dr. Crawford said he would like to ask, Is it possible for us to preserve all teeth so they will be retained and be useful through life?

Dr. Williams said we might as well ask whether the physician is able to prevent death. We can do much to preserve the teeth in most cases, can increase and lengthen their usefulness, but many teeth have organic weakness and are doomed to loss before they are erupted.

Dr. Talbot said that if all the members of a family with average good teeth to begin with would visit a capable dentist from two to four times a year, he ought to be able to prevent the loss of any of the teeth. It is difficult to get many people to do this; they usually visit the dentist only when decay has progressed so far as to cause suffering, and in many cases too late for the preservation of the tooth. Some dentists succeed in getting their patients to visit them at stated times, others had chiefly a transient practice. He insisted upon seeing his regular patients from two to four times a year, and this should be the general practice.

There is great difference in different communities as to the quality of the teeth. Some years ago he attended a meeting of dentists in St. Louis, and while there was impressed with the large proportion of complete and beautiful sets of teeth. He does not know why the teeth in some communities are so much more perfect than in others. In wealthy communities the teeth are better cared for than among poorer people; but it is not all a question of care, but seems to be partially at least affected by locality.

Dr. D. R. Stubblefield said that his observation had taught him that some teeth are not salvable, no matter how early they come under the care of the dentist. He knows that teeth can be saved and are saved, but there are some that our best care can retain in the mouth for only a short period. This is owing to inherent defect of structure or to systemic condition. There is a broad field for investigators to find out the reason and the prophylaxis of these constitutional weaknesses. He had a case in mind of a boy of four years of age whose premolars are absolutely dissolving away, and he knows of nothing that he could do to save them. He said he had cut in and inserted fillings in the hope that the resulting irritation would cause an increase of nutrition and thus prolong the usefulness of the teeth, with, however, but little hope of success.

Dr. Williams said that the teeth are the hardest and most enduring structures in the human organism, and when we have the proper knowledge of how to preserve them they will be the last to yield to disease, as they are the last to yield to the powers of decay after death.

Dr. R. B. Lees said he was much interested to learn how to improve the quality of soft and chalky teeth. In these we must often meet with failure, not because of lack of skill on our part, but because of defective structure. Such teeth are found in patients who have no other defects perceptible by which we can account for them; the general health seems good and the growth of the bones seems normal, but the teeth are disintegrating. Will dietetic or other care on the part of the mother, the child, or the dentist make these teeth harder or more dense, and less liable to decay?

Dr. Williams asked for an expression of opinion as to the new terms proposed.

Dr. Crawford considered the suggested words as more nearly expressing the modern practice of dentistry, but thought it would be difficult to secure their adoption either by the community or by the profession.

Dr. Gordon White said he thought the terms suggested described dentists and their calling more fully than did the terms now in use.

Dr. H. O. Marcy, of Boston, Mass., read a paper on

CURE OF CLEFT PALATE BY A DOUBLE FLAP OPERATION, WITH THE BURIED TENDON SUTURE,

of which the following is an abstract:

In nearly all surgical operations we find distinctive modifications and surprising gain in result, based upon the knowledge of the rôle of bacteria in wounds. In large measure, however, the surgery of the mouth, the throat, and the nasal passages has proved an exception, since all wounds of these tissues, as ordinarily treated, must be looked upon as extremely liable to become infected from the ever-present bacteria existing in the mucous secretion of the tract, and successively conveyed to it in respiration and in the taking of food.

Dentistry, as an art, may be said to have commenced with the present generation, as a science within the last few years, since by the labors of Miller, Nelson, Andrews, and others the demonstration is ample that dental decay is dependent upon bacterial development within the structure of the teeth. All scientific observers now agree that the preservation of a diseased tooth is dependent upon the removal of the infected portion, and the treatment of the member in such a way as to preserve its tissues permanently aseptic. These principles when applied to the treatment of a single tooth are comparatively simple and easy to carry into effect. When the cancellated structure of the jaw or any of the bones forming the nasal or oral tract is involved, the conditions are much more serious, and the limitations or removal of the infected parts often prove a problem very difficult of solution.

Wounds of the soft parts, even when made through comparatively healthy tissues and closed with the greatest nicety by the surgeon at the time of operation, often heal very unsatisfactorily, becoming the seat of at least a local infection, and repair either fails entirely or goes on slowly by the process of granulation. This has its explanation in the great difficulty of excluding infecting material from the wounded surfaces; and the reason that general septic inflammation, with its attendant danger, is not more common, is found in the extraordinary vascularity, affording a better protective nutrition of the parts involved.

Plastic surgery of the oral cavity has made comparatively little advance for the above reasons, although it is almost entirely revolutionized in other parts of the body by modern surgical procedure.

Operative measures for the relief and cure of cleft palate generally fail on account of non-closure of the wound, especially at its free or distal extremity, dependent upon infection and the difficulty of retaining the parts at rest. During the last few years the attempt at repair is less often made by the surgeon than formerly, doubtless in large measure due to the extremely ingenious and useful mechanical devices in the way of artificial plates, one of the distinctive triumphs of American mechanical dentistry.

I confess myself to have given over the field as one entirely unfruitful of surgical relief until within the last year, when I carried into effect, in a single case, the method which forms the subject of this brief contribution.

Miss J., aged twenty-five, a strong and healthy woman, had a congenital cleft of the soft palate, with only a slight indentation of the bony structures. Each half of the uvula was well developed, and by moderate tension the edges of the cleft could be brought into apposition. After a careful explanation of the intended procedure, the patient cheerfully consented to the operation. Aided by Dr. Charles Bullock and Dr. S. L. Nelson, I commenced the operation by the introduction of a tracheotomy tube. With careful washing and irrigation the nasal and oral passages were rendered aseptic by the use of a sublimate solution of strength $\frac{1}{1000}$.

After the introduction of the mouth-gag and packing the pharynx with an aseptic sponge, the soft palate was seized upon each side, the edges slightly freshened by scissors and split laterally to the depth of about one-third of an inch. The posterior flaps thus formed were carefully joined by a very fine "over and over" tendon suture. A somewhat larger suture commencing at the angle of the base of the division of the flap was carried laterally from side to side through the center of the soft palate, a little beyond the line of lateral division. This line of suture extended quite to the uvula. The approximation of the sides necessarily everted the edges and by so much increased the fresh surfaces brought in contact, while at the same time it completely buried the line of sutures. The everting edges presenting in the roof of the mouth were then carefully joined by a very fine continuous-tendon suture. Two double-looped stitches taken as far away from the central line as possible were then introduced, in order to prevent any lateral strain upon the central wound. The mouth and nose were closed, and only rarely required to be cleansed of mucus during four subsequent days ; after cleansing they were dusted with iodoform by means of the iodoform-blower.

Respiration went on comfortably through the tracheal tube. A large injection of weak beef tea, given once in six hours, served the purpose of food and drink.

The wound remained non-infected, and repair ensued as in aseptic wounds in other parts of the body, with the exception of the tip of the uvula, where a small slough formed from over-constriction of the suture.

The above case is reported as an experimental study, and is at least instructive as giving possibilities of better surgical results than those generally obtained in this most distressing deformity. Whether such seemingly heroic procedure as antecedent tracheotomy may meet the approval of the profession is a question for discussion. Without it, all attempt at rigid antiseptic conditions of the part is seemingly futile. External wounds of the body are readily sealed from bacterial infection by the simple application of iodoform collodion, but thus far all attempts have failed in protecting mucous surfaces by germ-proof dressings, and we are under the necessity of making the cavity itself aseptic and maintaining it in this condition until repair can ensue, or accepting the danger of infection, which, when respiration is allowed to go on in the usual manner, generally gives failure as the result.

The advantages of the use of the tendon suture in this operation appear to be equal to those claimed for it in operative wounds in other parts of the body, and if this is true it is the only suture material to be recommended for this operation.

If it shall happen to me to attempt again the repair of these parts, a modification of instruments would simplify in a considerable degree the operation. Forceps bent at a suitable angle, the blades protected by rubber tubing to prevent injury of the inclosed parts, will greatly facilitate the seizure and holding of the flap preparatory to splitting it. The division also can be effected easier by a knife the blade of which is at a suitable angle to the handle.

The needle forceps also need special adaptation of the curve for the easy introduction of the sutures. Any practical surgeon, however, can effectually operate with the instruments ordinarily at his disposal.

(After reading the paper Dr. Marcy handed to the members, for examination, specimens of the sutures which he used in the case described. They were made of the tendons from the tail of a kangaroo, and some of them were nearly three feet in length, and, as the members discovered upon trying to break even very fine ones, were remarkably strong. Dr. Marcy thought this material far superior to catgut sutures, and proposed to experiment with similar sutures from the tails of other animals in which the tendon extended the whole length of the tail; the opossum, for instance, though no animal of which he knew would afford tendons of the length of the kangaroo.)

Discussion.

Dr. J. S. Marshall (read by Dr. Talbot). At the request of the secretary of the section I have consented to open the discussion, and through the courtesy of Dr. Marcy I have had an opportunity of giving the paper a careful reading. I consider the paper a valuable one, in that it presents an entirely new method of operation for closing cleft palates. Whether it will revolutionize the common practice of this operation, time only will show. It is, however, a step in the right direction, as it looks toward establishing and maintaining an aseptic condition of the mouth during the operation, and also during the process of repair.

Those of us who have had experience in operations upon the soft tissues and bones in and around the oral cavity will appreciate how great a boon thorough aseptic conditions would be in all wounds opening into the mouth, knowing how difficult it has been to prevent suppuration in compound fractures and other extensive injuries to the maxillary bones.

Miller in his researches has found more than a hundred forms of micro-organisms in the human mouth, including nearly all the pathogenic forms known to science, while the most cleanly mouths are found to be the constant habitat of a variety of forms. It would seem to be a herculean task to cleanse the mouth and render it thoroughly aseptic, even by the method suggested by the essayist.

It has been my practice for years to combat the tendency to infection by the use of solutions of bichloride of mercury and of carbolic acid of various strengths, the parts being irrigated and sprayed with them at frequent intervals.

Dr. Marcy's method could hardly be utilized in cases of severe comminuted fractures of the jaws, where many times, under the most favorable circumstances, it requires from two to three weeks to heal the external wounds, and serious results might follow such prolonged tracheal breathing and rectal feeding.

In the operation of staphylorraphy I believe the aseptic method will prove of great value, though to the patient tracheotomy and the plugging of the throat and nose will seem very formidable, and will deter a good many from availing themselves of the apparent benefits.

With the new features of the operation itself I am still more pleased. The great difficulties in the way of a successful result in closing the velum palati have been to obtain perfect coaptation of the freshened edges, the prevention of tension upon the stitches, and perfect rest of the parts. These are all overcome by Dr. Marcy's method. In the lateral splitting of the velum along the border of the cleft the fresh surfaces are greatly increased, and by that much would seem to add to the chances of successful union.

The method of stitching is unique, and the use of the buried tendon suture adds to the probability of a successful result, though at first thought it would seem somewhat difficult to accomplish except by instruments specially designed.

The result of the case reported is, however, no better, in fact not so good, as in some cases which have been treated by the old methods of operating, as primary union throughout the whole extent of the wound is sometimes obtained by them. By the old method about one in four are failures, but Dr. Marcy's method gives promise of better results, and until such time as it has received a fair trial we should withhold our judgment.

Dr. G. Frank Lydston said, in regard to the suture introduced by Dr. Marcy, that while he had had no experience with it he was pleased with the results described, and would employ his method at the first opportunity, as it appeared to be better in many respects than anything he knew of. He could see many advantages this substance possessed over the ordinary gut sutures, silver wire, or silk. The best way to asepticize silk sutures was to boil them immediately before using, and there would be no necessity for dipping them into any antiseptic fluids, which are liable to corrode the silk.

Any material used for sutures, especially silk, no matter how well it is asepticized, in operations about the abdomen and in hernia will be more or less liable to infection by coming into contact with particles of food. This is also true in operations for cleft palate. He remembered one case of cleft palate where the part refused to heal and inflammation set in, where he had discovered a particle of potted hare had lodged. The hare was rather gamey when eaten, and lodging in contact with the raw surface had rapidly infected it, and not only caused trouble in the part but had given rise to serious febrile disturbance of the system. The part was cleansed with proper disinfectants, and slowly healed by the process of granulation. Such an example shows how small a particle of food or other septic material may cause a serious systemic condition. It seems that the parts about the teeth are less seriously affected under some circumstances than any other part of the body. The matter that is excreted in abscess and pyorrhea alveolaris, if taken into a syringe and injected into any other part of the body, would be sure to affect the system very seriously. The reason that the same trouble does not follow in the ordinary course of these diseases is because the excretions are immediately washed down with the saliva and food, and, though they no doubt have a bad effect from their presence in the stomach, it is not so bad as if they were introduced into the blood. He remembered one case in which a scratch on the tongue had become infected by the virus from a small specific sore in the mouth. The tongue swelled up frightfully so as to completely fill the mouth ; the whole face and neck became edematous, and in twenty hours death ensued from the suffocation and the exhaustion caused by blood-poisoning. The uses to which this new tendon may be applied were very interesting to him. Experiments in bone-grafting have proved that a peg of bone inserted into the ends of bones which are to be united seems to be beneficial in hastening the union of the bone. This new substance may serve a similar purpose, as it may be made aseptic, and would apparently act the same as the bone-graft.

Dr. W. H. Morgan said the paper seemed to him remarkable in the heroic measures adopted and the good results obtained. We all know that the chief difficulty in such operations is to ward off sepsis. Most of the operations he had seen had been almost or entire failures. He wished to call attention to the immunity of the negro race from the deformity of cleft palate. He had lived many years in a community where there were many negroes, and never saw one with a case of cleft palate. One of the chief difficulties in the practice of oral surgery is to avoid infection. One of the gentlemen said it was surprising there was so little infection caused by alveolar abscesses. The reason is the impermeability of the sac in which they are contained, which prevents the septic matter from entering the circulation. When the pus escapes into the mouth, it is carried into the stomach, digested, and destroyed, not however harmlessly. It did exert a bad influence when carried into the stomach, though not the active poisonous effect it would have if introduced into the blood. He did not think there ever was a case of long-continued pyorrhea alveolaris where there was no deterioration of vital force. Such an one may appear strong and healthy, but let him be attacked by a serious disease and he is much less likely to recover. Then there are cases in which the health is always reduced and difficult to build up. With such patients the removal of the affected teeth will work a wonderful improvement in the health.

(To be continued.)

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE twentieth annual meeting of the South Carolina State Dental Association was held at the Charleston Hotel, Charleston, S. C., May 13, 14, and 15, 1890.

The excellence of the papers read, the variety of the clinics, with the financial results, made this meeting the most successful in the history of the association.

The following officers were elected for the ensuing year: E. C. Ridgell, president; J. T. Calvert, first vice-president; J. R. Smith, second vice-president; A. T. Peete, corresponding secretary; B. Rutledge, recording secretary; G. W. Dick, treasurer; and L. S. Wolfe to fill the vacancy in the Board of Dental Examiners.

Anderson was selected as the next place of meeting, in July, 1891.

ALFRED T. PEETE, *Corresponding Secretary*,
Branchville, S. C.

CONNECTICUT STATE DENTAL ASSOCIATION.

THE twenty-sixth annual meeting of the Connecticut State Dental Association was held at Hartford, Conn., May 20, 1890.

The following officers were elected for the ensuing year: Civillion Fones, president; E. S. Gaylord, vice-president; George L. Parmele, secretary; Joseph H. Smith, treasurer; James McManus, William H. Rider, and C. C. Barker, Executive Committee.

GEORGE L. PARMELE, *Secretary*,
No. 25 Pratt street, Hartford, Conn.

AMERICAN DENTAL ASSOCIATION.

THE thirtieth annual session of the American Dental Association will be held at Excelsior Springs, Mo., commencing Tuesday, August 5, 1890, at 10 o'clock A.M.

GEORGE H. CUSHING, *Recording Secretary.*

The railroad arrangements are not all completed, but enough is known to assure at least the usual reduction of one and a third fare, on certificate plan, by all the different passenger associations.

Arrangements are being made for a special train from Chicago, which will leave here Sunday afternoon and reach Excelsior Springs Monday morning. This will give the entire day, Monday, for the different sections to complete their reports.

All parties wishing to go in this special train will confer a favor by letting us know at once, so that we may know how many to arrange for. Just what rate will be secured for the round trip is not definitely settled, but we expect a low one. A notice will be issued later, giving exact time of starting and route selected.

Application has been made for reduced rates for the four associations,—The American Dental Association, College Faculty Association, National Board of Dental Examiners, and the Dental Protective Association. We are trying to get this rate good for ten days, so that we need not adjourn before everything is finished.

Parties purchasing tickets should be sure to get receipt, showing that they have paid full fare going. This will enable them to get return ticket for one-third regular fare.

J. N. CROUSE, *Chr. Ex. Com.*,
2231 Prairie ave., Chicago.

SOUTHERN DENTAL ASSOCIATION.

THE twenty-second annual meeting of the Southern Dental Association will be held at Atlanta, Ga., July 15, 16, 17, and 18, 1890. A list of the committees and of the clinicians was published in the DENTAL COSMOS for April.

All railroads south connected with the Southern Passenger Association, all railroads north subject to the Trunk Line Passenger Committee, and all railroads west subject to the Central Traffic Association, will furnish transportation at the rate of full fare going and one-third fare returning to dentists and their families.

Parties to avail themselves of these reduced rates must procure certificates from the agent at the starting-point, which certificate must be countersigned by the corresponding secretary, Dr. D. R. Stubblefield, in Atlanta, before returning. No refund of fare will be made on any account whatever because of failure of parties to obtain certificates.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE next meeting of the National Association of Dental Examiners will be held in Excelsior Springs, Mo., Monday evening, August 4, 1890, at eight o'clock, and at other times during the week, between the sessions of the American Dental Association.

It is important to have every State board represented.

FRED. A. LEVY, D.D.S., *Secretary*, Orange, N. J.

NEW JERSEY EXAMINATIONS.

THE next meeting of the State Board of Registration and Examination in Dentistry of New Jersey will be held at the Coleman House, Asbury Park, July 15, 1890, commencing at 10 A.M.

Persons desiring to commence the practice of dentistry in the State must apply to the secretary for proper blanks, and on them make application for examination at least two weeks before the above date.

The books for registration will also be open at this time. Those desiring to register must bring diploma or certificate, also proof of having been legally in practice in New Jersey before the 7th of April, 1890.

G. CARLETON BROWN, *Secretary*,
No. 116 Broad street, Elizabeth, N. J.

MAINE DENTAL SOCIETY.

THE Maine Dental Society will hold its twenty-fifth annual meeting at Augusta, on Tuesday and Wednesday, July 15 and 16, 1890.

E. C. BRYANT, *Secretary*, Pittsfield, Me.

DENTAL COLLEGE COMMENCEMENTS.

NATIONAL UNIVERSITY—DENTAL DEPARTMENT.

THE sixth annual commencement of the Dental Department of the National University was held, with that of the medical department, in Lincoln Hall, Washington, D. C., on Tuesday, May 13, 1890.

The address to the graduating classes was delivered by Louis Kolipinski, Phar. D., M.D., professor of surgery, and the valedictory address by Dr. Charles M. Buchanan.

The degree of D.D.S. was conferred on the following dental graduates by Hon. Samuel F. Miller, of the United States Supreme Court, chancellor of the university:

NAME.	STATE.	NAME.	STATE.
Richard P. Cronin,	Dist. of Columbia.	J. W. Hollingsworth	Virginia.
William B. Daly	Dist. of Columbia.	Herbert B. Hoag	New York.
Theodore Erck	Missouri.	Benj. F. Odell	Illinois.

EDITORIAL.

THE ANNUAL MEETINGS.

THE approaching sessions of the American and Southern Associations will, it is believed, exercise a more than ordinary influence in determining their future. It is not to be disguised that interest in these gatherings has not kept pace with the increase of the profession. The reasons are probably not difficult to discover. The section and committee work has not of late shown that careful preparation which is required to make their reports of value. Too much dependence has been placed on the chairmen, too little attention been given by the members, and as a result some of the reports have been commonplace and without interest. Many of the papers have shown haste in their preparation, and have been discursive, verbose, and sadly lacking from the literary stand-point. The results hoped for in the creation of sections in the American Association have not been realized, and will not be so long as members depend on the efforts of chairmen and secretaries, nor while chairmen are content to frame hasty reports after the sessions of the association have begun.

When clinics are provided for, too little effort has been made for a systematic arrangement as to operations, patients, and class of operation. These too frequently have been left for adjustment by fortuitous circumstance, and disappointment has resulted.

Clinics might prove an important feature of every session, but can be made so only by careful pre-arrangement. Such arrangement might, it would seem, properly exclude operators having a pecuniary interest in a material or device which is used in clinic chiefly as an advertisement. They might also exclude all ordinary every-day office operations, and include only such as are novel or difficult of performance. These occasions are not intended for the training of tyros, and only those operators should be selected who can by the illustration of new methods and by special manipulative ability make the clinics interesting and instructive to the most advanced practitioners. But while clinics have a distinct sphere of usefulness, they should not be permitted to absorb the time which would better be devoted to the discussion of principles of practice and topics of general interest and value.

A serious drawback to the value of these and of all like gatherings is the fatal facility of talk, the alarming amount of language which has to be sloughed off before a solid reality is reached. This diabolus of talk is a pestilence which has ruined many meetings. "Stop when you are done," was one of Luther's nine rules to ministers, but the millennium will not be far distant when on such occasions no one will speak without he has something to say and will stop when he has said it.

It would seem also that the hour has fully come when self-laudation, self-glorification of the individual or of the profession in a professional meeting, might be safely omitted. Time was when it may have served a useful purpose as a stimulus, but that time has passed. The profession has had its day of youth, and if its manhood is not apparent no indulgence in "me big injun" talk will avail.

An effort should be made to have these anniversary meetings serve advanced thought, and not be permitted to be given up to the repetition of excellent but obvious commonplaces, to a discussion of questions which do not need to be sustained or controverted. Some things may be considered as established, some principles as accepted, some truths as final. The endless insistence on that which has either been adopted or discarded is a "weariness to the flesh."

Although a delicate subject to treat of, it needs no argument to show the evil of the political wire-pulling which sometimes becomes so paramount as to disgust the thoughtful. It is a fact that some members give their dislike of the unseemly struggle for the election of certain candidates as the reason for absenting themselves from the meetings.

Earnestly desiring the advancement of the dental profession in usefulness, in self-respect, and in public regard, we hope to see each passing year register growth not merely nor chiefly in improved handicraft, but in the development, recognition, and application of scientific truths, the collection of the diffused rays of intelligence and their concentration upon dental science and art. Of such growth the American and the Southern Dental Associations should be alike the promoters and the exponents.

THE CURRENT NUMBER.

More than usual space is given in this issue to the consideration of topics outside of the lines of routine practice and discussion. The practical relation, however, of such papers as those of Drs. Miller, Dean, and Palmer cannot be questioned. They are emphatically dental, and if in advance of current thought are therefore all the more valuable, and will well repay careful study. They suggest lines of thought worthy of further development. Such papers are indicative of a growth which makes dentistry a profession in something more than a name. We are glad that essays of this character find intelligent appreciation by our readers, and glad that the men to write them are furnished by the profession.

BIBLIOGRAPHICAL.

THE STUDENTS' MANUAL AND HAND-BOOK FOR THE DENTAL LABORATORY. Second edition. By L. P. HASKELL, Professor of Prosthetic Dentistry, Dental Department of the Northwestern University, Chicago. To which is appended Dr. E. H. Angle's System of Appliances for Correcting Irregularities. Octavo, pp. 97. Philadelphia: The Wilmington Dental Mfg. Co., 1890. Price, cloth, $1.50.

The author of this little volume brings to his work a recognized competency which is a guarantee of the practical character of the instructions given. The student and the experienced dental mechanician will alike find a value much beyond the price of the book,—which might, however, have well included further details of laboratory methods and manipulations. The considerable addition of illustrated examples of the Angle system of regulation and retention adds to the value of the book. The publisher's part of the work is satisfactory, but a careful proof-reading would have been of advantage.

CHEMISTRY: INORGANIC AND ORGANIC. With Experiments. By CHARLES LOUDON BLOXAM. Seventh Edition, Revised and Edited by JOHN MILLAR THOMSON, Professor of Chemistry, King's College, London, and ARTHUR G. BLOXAM, Demonstrator of Chemistry, Royal Agricultural College, Cirencester. With 330 Engravings. Octavo, pp. 799. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $4.50; leather, $5.50.

This standard work has been carefully revised and brought up to date by the competent editors whose names appear on the title-page. The chemistry of vegetation has been largely rewritten, and concise accounts of modern researches are given in the division of organic chemistry, with the applications to processes of manufacture of organic products. The chemistry of the metals is very full and complete, and eminently practical in the careful descriptions of the applications of chemistry to the industrial arts. A vast accumulation of facts is presented, making the book invaluable as a work of reference, which is made easy by an exhaustive index. The division on the chemistry of the metals should make the book of especial value to dentists.

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OBITUARY.

DR. HOMER JUDD.

DIED, at Upper Alton, Ill., May 20, 1890, of cancer of the stomach, HOMER JUDD, M.D., D.D.S., in the seventy-first year of his age.

Dr. Judd was born at West Otis, Berkshire county, Mass., March 29, 1820; studied medicine with Dr. James Welch, of Lee, Mass., and graduated at the Berkshire Medical College, Pittsfield, Mass., in 1847. He studied dentistry with Dr. C. O. Cone, of Baltimore. Dr. Judd commenced the practice of medicine and dentistry at Ravenna, Ohio, and subsequently pursued the practice of the latter profession at Pittsfield and Warsaw, in Illinois, and at St. Louis, Mo. He served as surgeon during the Rebellion from the fall of Fort Donelson to the end of the war in 1865.

Throughout his career Dr. Judd was active and progressive in educational and professional matters. He was a member of the American Medical Association and of the St. Louis Medical Society; was president of the Missouri State Dental Association, of the American Dental Association, and of the St. Louis Dental Society; an active member of the Illinois State Dental Society, and of the Illinois State Board of Dental Examiners. He was prominent in the organization of the Missouri Dental College, and was dean of its faculty for many years. He also originated and edited the *Missouri Dental Journal.*

In 1882 Dr. Judd established his dental office at his residence at Upper Alton, but of late years had given up active practice. His wife and two daughters survive him.

The St. Louis Dental Society, at a meeting held May 20, 1890, reported and passed resolutions (prepared by a committee consisting of Drs. W. H. Eames, Henry Fisher, and A. J. Prosser) of respect to the memory of Dr. Judd. The resolutions characterize him as a man of "great natural abilities, ripe scholarship, zeal, industry, and integrity, who was recognized by the dental profession as one of its most influential members,—a man who devoted his life to the honor and advancement of his profession."

DR. CLINTON ATKINSON.

DIED, in New York city, May 31, 1890, of pneumonia, CLINTON ATKINSON, M.D., aged forty-eight years.

Deceased was the eldest son of Dr. Wm. H. Atkinson, so well known in dentistry. He was a graduate of the College of Physicians and Surgeons of the City of New York, of the class of 1869. He had been for many years his father's chief assistant in the practice of oral surgery.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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THE

DENTAL COSMOS.

VOL. XXXII. PHILADELPHIA, AUGUST, 1890. No. 8.

ORIGINAL COMMUNICATIONS.

EXPERIMENTS ON THE COMPARATIVE VALUE OF VARIOUS ANTISEPTICS IN THE TREATMENT OF DISEASED TEETH.

BY W. D. MILLER, M.D., D.D.S., BERLIN.

It is a fact familiar to every practitioner of dentistry that the complete removal of the remains of a necrotic pulp from its canal is often accompanied by very great, if not by practically insurmountable, difficulties.

While it is a comparatively easy task to cleanse the canals of the upper front teeth, and one which usually may be accomplished to the complete satisfaction of the operator, the bicuspids often put our skill and endurance to the severest test, and few operators would have the hardihood to claim that they can always thoroughly cleanse the canals of the buccal roots of the upper or of the mesial root of the lower molars with any degree of certainty. In fact, I do not at all hesitate to say that in the majority of cases these roots are very imperfectly cleansed, even by those who claim to have attained to perfection in this branch of operative dentistry.

In all such cases where remains of necrotic or decomposing pulp-tissue are left in the root-canals at the time of filling, it becomes the object and duty of the operator to so impregnate them by the application of the antiseptic most suitable for the purpose as to reduce the possibility of their subsequent putrefaction to a minimum.

I have no doubt that the great majority of dentists who are willing to be perfectly candid will confess to having repeatedly, knowingly, left considerable portions of narrow, contorted root-canals uncleansed after pumping into them some antiseptic with the finest possible nerve-broach, without at the same time departing from the principle that, when at all possible or judicious, the last trace of the pulp should be removed before filling.

Some eight years ago, Telschow* advanced the idea that the removal of the devitalized pulp is an unnecessary torture and trouble. He claimed to be able, by boring into the pulp-chamber and applying a certain mixture to the pulp, to prevent its subsequent decomposition, or even to arrest the decomposition when it had already set in. The mixture recommended by Telschow was nothing other than a modified form of the well-known Wickersheimer fluid, by the *injection* of which corpses of animals (fishes, snakes, monkeys, etc.) may be kept indefinitely in a fresh condition. Telschow overlooked the fact that there is a vast difference between *injecting* a substance and applying it superficially to one end of an elongated body. If he had tried the experiment of putting a pledget of cotton saturated with Wickersheimer fluid in the snake's mouth, he would then have had an analogon of the operation which he recommends for the human tooth-pulp.

Nevertheless, exceedingly favorable results were reported from the use of the Wickersheimer fluid. Six years later, Baume ("Ein neues Princip der antiseptischen Behandlung devitalisirter Pulpen durch Imprägnirung mit Salzen," *Deutsche Monatsschrift für Zahnheilkunde*, März, 1888) recommended the same method of treatment, making use of alum and borax instead of Wickersheimer fluid. He reports having treated over two hundred pulps, devitalized with arsenic, with these salts without a single failure.

Personally I had no faith whatever in the treatment with Wickersheimer fluid, and very little in the treatment with borax, and consequently have made no use of either of these materials in my practice or in the clinic of the dental institute. In cases where I for any reason have not accomplished the complete extraction of the pulp, I have preferred to use stronger antiseptics than either of the above mentioned.

If we ask the question, Which of the many antiseptics found in the dental materia medica is best adapted to prevent decomposition either of inextricable pulp-remains or of whole pulps? we will obtain answers which will convince us that the greatest diversity of opinion exists in regard to this question. Creasote, carbolic acid, salicylic acid, thymol, bichloride of mercury, chloride of zinc, trichlorphenol ($C_6H_2Cl_3OH$), tincture of iodine, iodoform, naphthaline, peroxide of hydrogen, sozoiodol, oil of eucalyptus, β-naphthol, hydronaphthol, campho-phenique, carbonate of soda, and the ethereal oils are by no means all of the agents which have been recommended and used "with the greatest success" in the antiseptic treatment of root-canals.

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* Ein neues antiseptisches Verfahren zur Erhaltung cariöser Zähne.

Finally, it has been claimed that the agents upon which we have placed so much reliance—sublimate, carbolic acid, etc.—are not only useless but detrimental in the treatment of pulpless teeth ; and furthermore, that the object in view can be accomplished quite as well with distilled water as with any of the antiseptics named. In fact, the opinions of the dental profession at present regarding antiseptics may be said to be in a state of utter chaos,—a fact which may be readily accounted for, I think, on the following grounds :

In attempting to assign the success or failure of operations upon diseased teeth to their proper causes, factors of the greatest importance are frequently left out of account, and the results ascribed to some agent which may have been entirely indifferent. One of these factors, often overlooked, which forms the very foundation of successful root-treatment, is the *manner* in which the mechanical cleansing of the canal is carried out.

The operator who thoroughly appreciates the nature of the organ upon which he is operating, and never forgets that the root of the human tooth forms a tube open at both ends,—who, equipped with the proper instruments, possesses sufficient patience, skill, and delicacy of manipulation to clear out the contents of the canal instead of forcing them farther in, will not have an undue number of failures to complain of with any antiseptic of moderate strength. It is also equally true that an operator whose clumsy instruments and unskillful fingers cleanse the canal only by forcing its contents through the apical foramen will have one failure after another, whatever antiseptic he may use. While now the successful operator attributes much of his success to the antiseptic used, the unsuccessful one attributes still more his failures to the same agent.

Again, those who have introduced new antiseptics to the profession have almost invariably had "wonderful success," no matter how worthless the antiseptic may have been. We must never forget that teeth whose pulps are devitalized with arsenious acid and filled immediately without any treatment whatever may remain perfectly quiet for weeks, months, or years, and sometimes never give any trouble.

The same is true to a certain degree of teeth whose pulps die under fillings. When we treat a tooth or a certain number of teeth by means of a given new antiseptic, and the teeth give no trouble after a few weeks or months, we still cannot say whether the apparent success is due to the medicament, or is independent of it, or has been accomplished in spite of it.

It has taken nearly ten years to find out that iodoform, which at the time of its introduction was believed to be quite equal to any task imposed upon it, is perhaps about one of the most worthless materials ever introduced to the profession for the treatment of devitalized pulps or of root-canals. In short, the real value of any antiseptic may be clinically determined only after years of observation by many practitioners on large numbers of teeth.

At present the views of the profession are equally as much, if not more, divided on this point than they were five years ago, and it would be rather venturesome for anyone to promise that five years hence our clinical experience will have brought us much nearer a solution. In the mean time new antiseptics will constantly be recommended and employed with the customary "great success," which in many cases will subsequently, to the great inconvenience of the patient, turn out to be great failure.

It is accordingly my opinion that the question of the comparative value of the many different antiseptics in use may be solved much more easily and quickly, and with much less discomfort to the patient, in the laboratory than in practice.

It is, moreover, very doubtful whether the practitioner of dentistry is justified in making use of his patients as subjects of experiment upon which he tests various antiseptics before he has thoroughly convinced himself, by properly conducted experiments, that the substance which he is employing possesses properties which give every reason to hope that its use will be accompanied by good results.

For this reason I have undertaken a series of experiments which I take the liberty to present in the following pages. With the help of my pupil and friend, Carl Yung, I have made up to date 393 separate experiments, in which I tested the action of chloride of lime, oil of wintergreen, oil of peppermint, oil of cinnamon, chloride of zinc, iodoform, borax, boracic acid, salicylic acid, benzoic acid, thymol, carbolic acid, chlorphenol, α- and β-naphthol, hydronaphthol, campho-phenique, sozoiodol, Lister's new antiseptic, sulphate of copper, iodol, sulpho-carbolate of zinc, cyanide of mercury, resorcin, and many other antiseptics of more or less repute.

The object of the experiments was to determine *what antiseptic penetrates pulp-tissue most readily and deepest, and most effectually preserves it from decomposition.*

METHODS OF EXPERIMENTATION.

For convenience of description my experiments may be arranged in five groups, determined by the manner in which the test was carried out. The different groups of experiments are in very different stages of completion. While those under Group I are far advanced, those in Group V are just begun, so that this report will require to be supplemented and probably in some points corrected by another which will follow later.

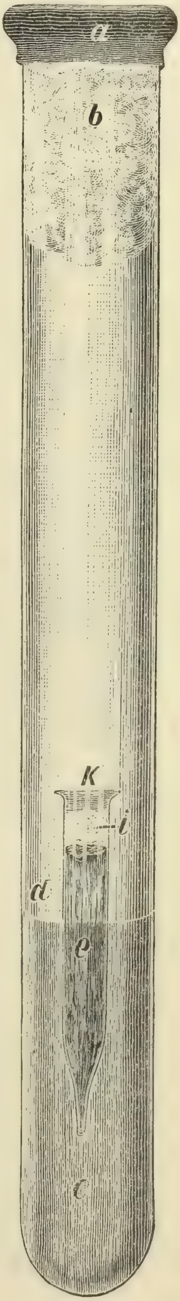
Group I.

The first permanent molar of the calf possesses at the time of eruption a pulp about one inch broad and half an inch thick, which divides at a quarter to a half inch from the base into five approximately conical columns which gradually taper toward the crown of the tooth. Four of these columns have a length of one and a quarter to one and a half inches; the fifth is much shorter and smaller. They represent separate centers of dentinification, and may be treated as separate pulps.

Having divided them at the base, we bring them into small glass tubes, flanged at one end and drawn out to a point at the other. Some difficulty will be experienced at first in getting the pulps nicely into the tubes, but anyone may soon overcome this. I tie a fine waxed silk thread around the pointed end of the pulp, moisten the latter with a drop of water, and then thread it into the tube; suction applied to the small end of the tube will also be found very effective.

These pulps are then infected, either at one or both ends or throughout, by bacteria obtained by stirring a number of freshly extracted teeth in a small quantity of water. Finally, the antiseptic to be tested is applied to the pulp at the larger end, covered with cotton, and the tube closed with melted wax. This tube with the pulp is then brought into a test-tube containing nutritive agar-agar, and the point made to extend considerably below the surface of the agar (Fig. 1); the tube is then closed with cotton in the ordinary manner, provided with a rubber cap, and placed in the incubator.

FIG. 1.*



Group II.

I made use also of the incisor and cuspid teeth of the calf, not, however, as a rule removing the pulps from the teeth, but simply boring into them from the lingual surface, applying the antiseptic, and closing the opening with wax.

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* FIG. 1.—ARRANGEMENT FOR TESTING THE ACTION OF ANTISEPTICS ON THE DENTAL PULP. *a*, rubber cap; *b*, cotton stopper; *c*, nutritive agar-agar; *d*, glass tube containing the pulp; *i*, cotton carrying or covering the antiseptic; *k*, wax.

This method did not give as satisfactory results as the former. The large size of these pulps, and particularly the wide foramen, seemed especially to favor the progress of the putrefactive process from the infected part toward the crown, so that the test proved too severe for nearly all of the antiseptics employed, except bichloride of mercury.

Group III.

To overcome the difficulty just referred to, the incisors and cuspids of the calf are extracted and freed from pericementum, and the root elongated by means of a short glass tube as represented in Fig. 2. A small opening is then made in the crown to represent an apical foramen and to admit of infecting the pulp. The antiseptic being applied through the glass tube, the whole is placed in a tube of nutritive agar-agar as explained above.

FIG. 2.

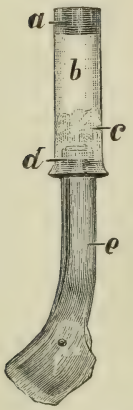


FIG. 2.—ARRANGEMENT FOR APPLYING ANTISEPTICS TO THE PULP OF THE INCISOR OR CUSPID TEETH OF THE CALF. *e*, tooth; *b*, glass tube fixed upon the end of the tooth with wax at *d*; *c*, cotton carrying or covering the antiseptic; *a*, wax; *f*, artificial foramen.

This method, which I have only begun to employ, appears so far to furnish very instructive results.

Group IV.

Freshly extracted human teeth whose pulps were not in a state of decomposition were likewise employed. The cavity was cleansed, the pulp-chamber freely opened, and the antiseptic applied to the pulp, covered with cotton, and the cavity closed with wax; liquids were of course applied on cotton. The further treatment was identical with that explained under Group I.

Group V.

I have just begun to experiment on the teeth of living dogs, but have no results to report at present. These experiments are attended by considerable difficulties, as the animals must be chloroformed at each operation. Cats are equally difficult to work upon, while the teeth of rabbits and guinea-pigs are not suitable for the purpose.

The employment of glass tubes in the manner described under Group I has the great advantage that the action of the antiseptic, as well as the progress of the putrefaction, is directly visible to the naked eye.

After the preparations had been in the incubator a length of time, varying from two days to many weeks, they were removed, the glass tubes cut across or the teeth split open, and the pulps carefully drawn out (their condition being minutely noted) and placed upon the surface of a plate of nutritive agar-agar. If the pulp was in a perfectly aseptic condition, or if it had taken up enough of the antiseptic to exert itself an antiseptic action, no bacteria developed around it; otherwise a portion of it or the whole, depending upon the strength and penetrating power of the antiseptic, would become enveloped in a growth of bacteria. No doubt the stereotyped objection may be made to these experiments that in the human mouth we do not have to treat pulps in glass teeth. Objections of this nature come principally from those who, in a dog-in-the-manger fashion, do not experiment themselves and feel called upon to growl at all who do.

The same objection might be urged with an equal show of reason against chemistry, physics, and allied sciences which study nature in glass tubes or within the four walls of a laboratory.

To a candid mind, however, it will appear that the decomposition of a tooth-pulp must take place in about the same manner in a tube of glass as in one of dentine, and an antiseptic which does not prevent a pulp from putrefying in the former cannot be depended upon for preserving it in the latter. Moreover, the experiments in Groups II to V are free from the glass objection, and finally approach so near to the conditions existing in the mouth that there can be no doubt of their practical value, particularly as the various methods have thus far yielded identical results.

RESULTS.

I cannot attempt (nor would it be advisable to do so) to give the results of each of the three hundred and ninety-three experiments thus far made. They would fill some fifty pages of the COSMOS, and necessitate much labor on the part of the reader who would attempt to sift them out so as to get at the fundamental facts revealed by them. I shall therefore give only the general results obtained with different medicaments.

1. *Iodoform.*

Attention has been frequently called to the fact that iodoform is far from possessing the marked antiseptic properties formerly attributed to it. This assertion is fully affirmed by my experiments.

Pulps treated by methods I to IV were found in a few days to be in a state of partial decomposition, soft, and stinking; brought upon the culture plate, they very soon became surrounded by a thick, vigorous growth of bacteria, even at the very point where the iodoform had been applied.

It has been maintained that when products of putrefaction come into contact with iodoform iodine is set free, and that, accordingly, in such cases where decomposition has already begun, iodoform is particularly efficient in arresting it. To test the accuracy of this claim a pulp was infected and, after putrefaction had set in, rolled in powdered iodoform and put into a glass tube. After nine days, it was taken out and placed on an agar-agar plate, where in twenty-four hours it became completely overgrown with masses of bacteria (Fig. 3).

FIG. 3.

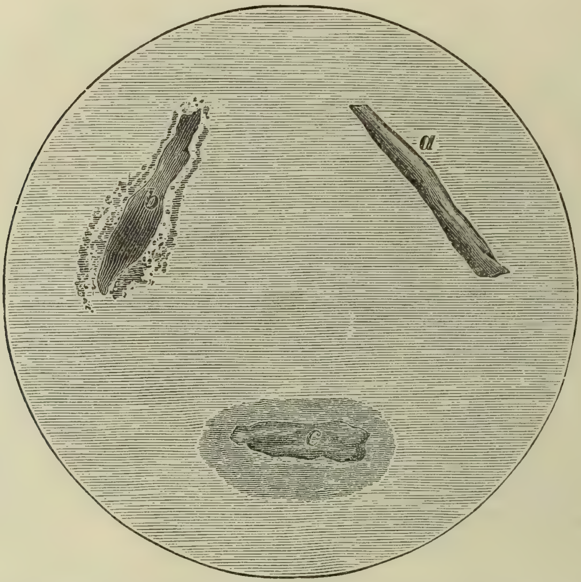


FIG. 3.—PLATE OF AGAR-AGAR WITH THREE PULPS. *a* had been treated with phenol; it remained sterile. *b* had been rolled in iodoform; it nevertheless soon became surrounded by a growth of bacteria. *c*, also treated with iodoform, is overgrown by micro-organisms.

I consider iodoform as one of the most worthless substances yet introduced for the purpose of treating the condition under consideration. That this fact has not been revealed by practical experience long ago is in part due to the circumstance that iodoform is nearly always employed in conjunction with some other material, such as carbolic acid, oil of cloves, etc.

2. *Chloride of Lime.*

This agent was employed in but two experiments; in these it so completely failed to manifest any retarding action upon the growth of bacteria in the pulps that it was discarded for further experiments.

3. *Peroxide of Hydrogen.*

Pulps treated with peroxide of hydrogen showed signs of putrefaction in from two to eight days, and on opening emitted an exceedingly intense putrefactive odor. On plates of nutritive agar-agar they soon became overgrown with bacteria. This is just what we should expect; this agent brought into contact with the pulp soon decomposes, and becomes then absolutely inert. It may be advantageously employed for cleansing root-canals, but not for preserving non-extricable portions of pulp-tissue against future decomposition.

FIG. 4.

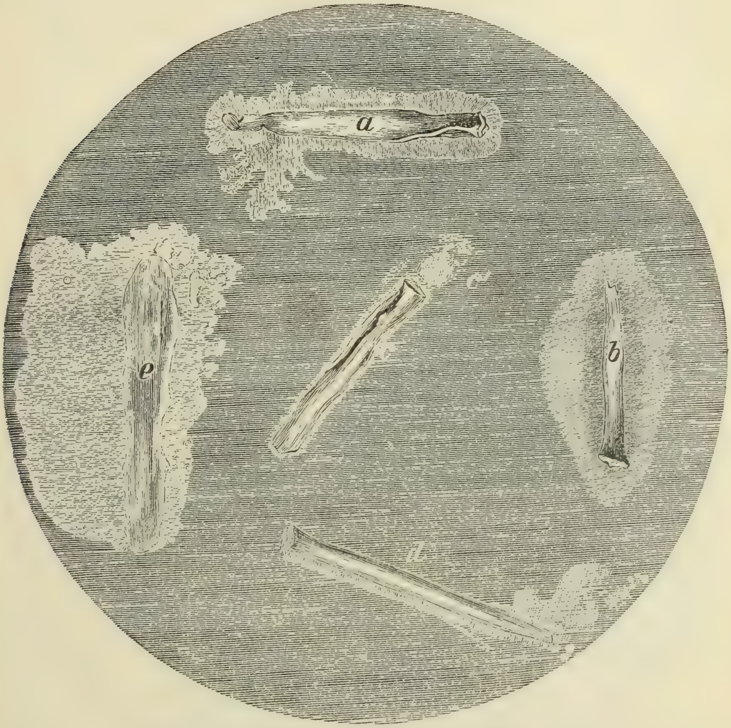


FIG. 4.—PLATES WITH PULPS FROM CALVES' TEETH. After treatment with β-naphthol (*a*), sulphate of copper (*b*), oil of peppermint (*c*), campho-phenique (*d*), sozoiodol (*e*). The whitish zone around *b* is due to a precipitate produced by the copper salt, and not to a growth of bacteria. At *c'* we see the cotton on which the oil of peppermint was applied also surrounded by a slight growth of bacteria. (In this illustration as well as in Fig. 8 the artist has made the agar-agar dark and the growths of bacteria light).

4. *Sozoiodol Salts.*

The salts of sozoiodol (a derivative of carbolic acid, having the formula $C_6H_4I_2SO_4$) having lately, after the manner of all new antiseptics, received such unlimited praise for their antiseptic, non-poisonous, non-irritating, and altogether desirable qualities, have also begun to be introduced into the dental practice. Pulps treated with the potassium salt (kalium sozoiodolicum) showed no difference from those treated with water (Fig. 4, *e*). The sodium salt showed a slight action, hardly worthy of consideration.

5. *Bichloride of Mercury.*

Bichloride of mercury in powder, applied to the end of a pulp one and one-half inches long, permeated the whole pulp within forty-eight hours, converting it into a stiff gray mass. Such pulps removed from the tubes at any time from two days to eight weeks were completely preserved, without a trace of smell or any sign of decomposition. In no case did any development take place around the pulps when they were placed on nutritive agar-agar ; not only that, but the pulps themselves showed a powerful antiseptic action (Figs. 5, 6, and 8).

FIG. 5.

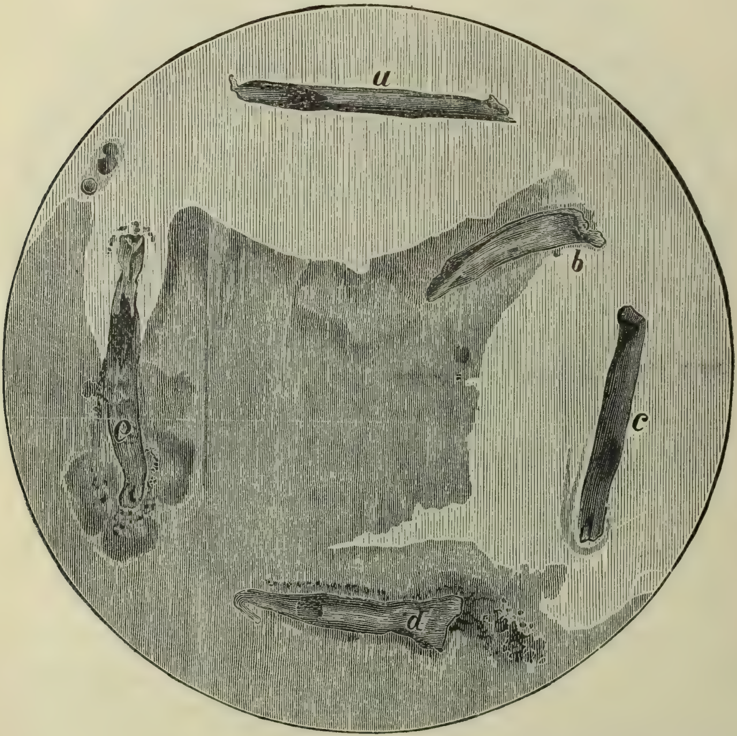


FIG. 5.—AGAR-AGAR PLATE WITH FIVE PULPS. *a* had been treated with sublimate, it remains completely sterile and no growth takes place near it ; *b* with oil of cinnamon, is pretty well surrounded by bacteria ; *c* with chloride of zinc, remains sterile except at the point ; *d* with borax, is completely overgrown ; *e* with five per cent. solution of sublimate, the upper half only remains free.

The results obtained in Groups II to IV confirmed the above. I have no hesitancy in saying that the bichloride of mercury applied to the pulp in form of powder is by far the most efficient antiseptic which has as yet been employed to any extent in the treatment of the teeth. It has, however, the great disadvantage of seriously discoloring the teeth, so that it must be used with great caution, and never in form of powder be applied to the front teeth.

6. *Bichloride of Mercury, Five Per Cent. Solution.*

I was much disappointed in the action of the 5 per cent. solution of the bichloride of mercury. In glass tubes it permeated and preserved only about one-half of the length of the pulp, leaving the other half to decompose. When the pulps were placed on the plates of agar-agar, they likewise became enveloped at one end in bacteria (Fig. 5, *e*).

FIG. 6.

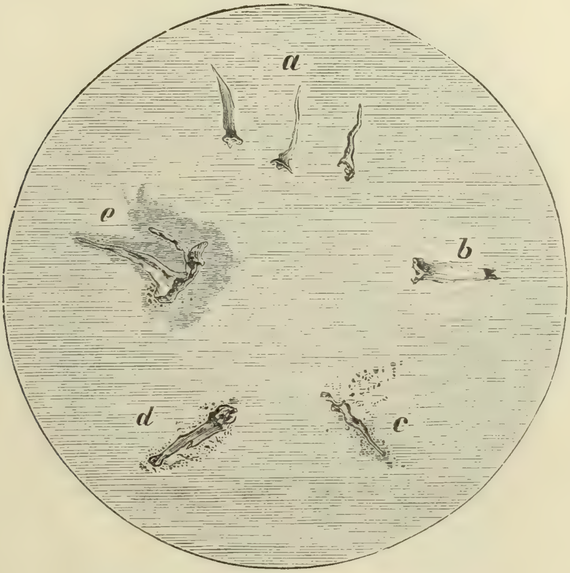


FIG. 6.—PLATE WITH PULPS FROM HUMAN TEETH. *a*, after treatment with oil of cinnamon; *b*, with bichloride of mercury; *c*, with borax; *d*, with campho-phenique; *e*, with oil of peppermint. *a* and *b* have remained sterile; the others are surrounded by a more or less extensive growth of bacteria.

7. *Sulphate of Copper.*

Sulphate of copper has a powerful penetrative and preservative action. The pulps soon become stiff, light green in color, and have a sour, metallic smell. Transferred to agar-agar, they mostly remained sterile (Fig. 4, *b*). Next to bichloride of mercury, it is perhaps the most efficient preservative which we have; unfortunately, it also badly discolors the teeth.

8. *Borax.*

Although borax appears to permeate the substance of the pulp very rapidly, its antiseptic action is correspondingly weak. The majority of the pulps treated with it showed evident signs of putrefaction in a very short time, some of them completely liquefying, giving off at the same time an exceedingly disagreeable odor. Occasionally, under application of large doses, they were tolerably well preserved, but on the whole the results were such that I should never think of using it in the treatment of diseased teeth. (See Fig. 5, *d.*)

9. *Boric Acid.*

The results obtained by boric acid were very similar to those of borax.

Fig. 7.

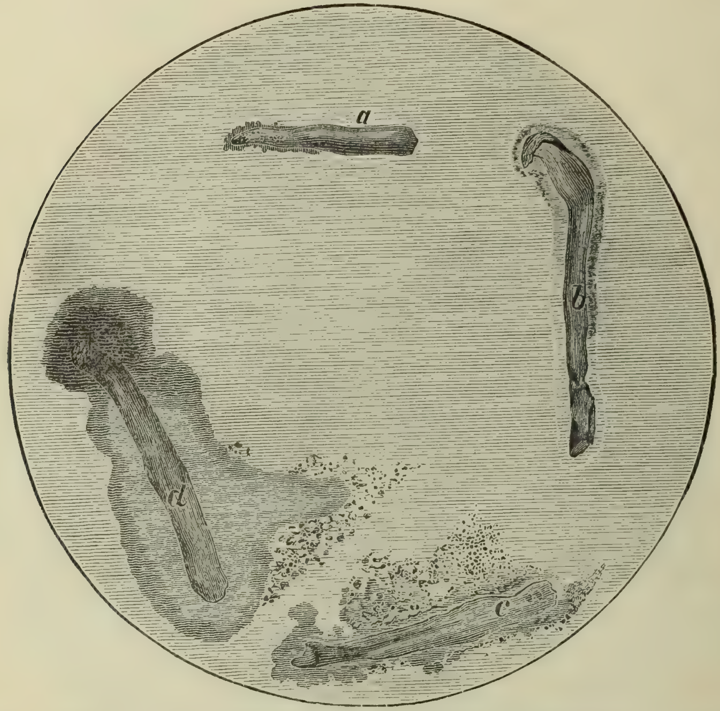


Fig. 7.—Agar-Agar Plate with Four Pulps. *a*, treated with oil of cinnamon, and *b*, with carbolic acid, have remained comparatively free from bacteritic growths; *d*, treated with methyl-violet, and *c*, with mytheleneblue, are completely overgrown.

10. *Ethereal Oils.*

The oils of peppermint, wintergreen, and eucalyptus gave at once results so little encouraging (Fig. 6) that but few experiments were made. I shall, however, make further tests with them. Oil of cloves appeared somewhat better. The best results, however, were obtained with *oil of cinnamon.* This oil permeates and stiffens the tissue with tolerable rapidity, tinging it various shades of yellow to brown. Pulps treated with it, placed upon the nutritive plates, proved to be sterile in a large measure (Figs. 6, 7, and 8). I am at present in doubt whether to place the oil of cinnamon on a level with trichlorphenol and carbolic acid; further experiments will be necessary to settle this question.

11. *The Double Cyanide of Mercury and Zinc,*

recommended by Lister in the treatment of wounds, applied in the form of powder, appeared to penetrate the pulp to a distance of one-quarter to one-half an inch. It utterly failed to preserve any considerable portion of the pulp from decomposition.

FIG. 8.

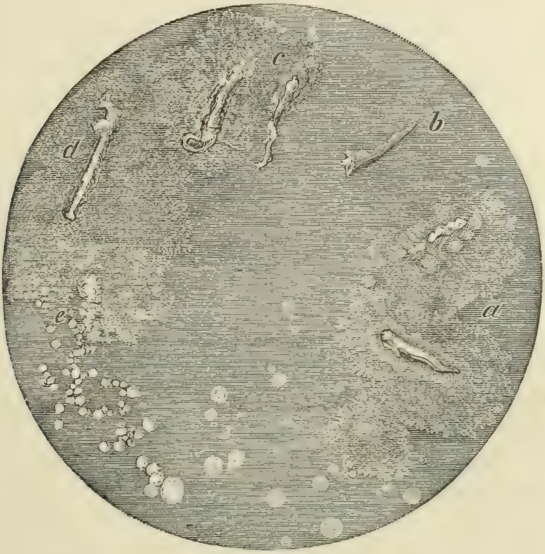


FIG. 8.—AGAR-AGAR PLATE CONTAINING: *a*, two pulps treated with borax; *b*, one with sublimate; *c*, two with carbolic acid; *d*, one with oil of cinnamon; *e*, one with iodoform. *b* has remained completely sterile; *c* and *d* are partially, *a* and *e* totally overgrown with masses of bacteria.

12. *α- and β-Naphthol*

applied in concentrated alcoholic solutions, manifested an evident conserving action; it was, however, so manifestly inferior to that of bichloride of mercury, carbolic acid, oil of cinnamon, etc., that I should never think of using these agents in practice. (See Fig. 4, *a.*)

13. *Hydronaphthol*

showed considerable penetrating, antiseptic, and consequently preservative action. I cannot say, however, that I was as well pleased with it on the whole as I have been with some other substances, or have received any incentive to use it in practice. Further experiments with this agent are necessary to enable me to come to a definite conclusion.

14. *Trichlorphenol.*

Trichlorphenol ($C_6H_2Cl_3OH$), formed by conducting chlorine into carbolic acid (phenol), occurs in form of white crystals, which liquefy at 65° C. It has a strong, irritating odor, but its escharotic action, as far as I have observed by a simple test on the skin, seemed less than that of phenol. Its antiseptic power has been said to be twenty-five times as great as that of phenol. This is very probably a great mistake. It possesses the property of penetrating pulp-tissue very rapidly, thoroughly hardening it and imparting to it a beautiful pink to red color. It also exerts a powerful antiseptic action, so that in its pulp-preserving property I think I may put it by the side of the sulphate of copper, although carbolic acid, chloride of zinc, and oil of cinnamon will compete with it for the place.

15. *Carbolic Acid* (*Phenol*).

Carbolic acid gave results so similar to those obtained with trichlorphenol that they need not be especially described. Its action appears on the whole not quite as powerful as that of trichlorphenol.

16. *Chloride of Zinc.*

Chloride of zinc penetrates the tissue quite as rapidly, and in some cases it has appeared even more rapidly than sublimate. Applied on cotton to the end of a pulp one and a half inches long, it will permeate the whole pulp in forty-eight hours, converting it into a grayish-white stiff body.

Such pulps transferred to the agar-agar plates very seldom showed any development of bacteria, except at the extreme point.

The antiseptic power of the chloride of zinc is, however, known to be inferior to that of many other available antiseptics, so that, on the whole, I am not yet sure where this agent should be placed on the list ; this will be determined by further experiments. It certainly has thus far produced a very favorable impression.

17. *Thymol and Salicylic Acid*

manifested an evident preservative action upon the dental pulp ; it was, however, very decidedly inferior to that of those substances just discussed, and usually confined to a small portion of the pulp. Of the two, thymol gave the better results, though I should not make use of it in practice, since we have so much better agents at our disposition.

Basic Aniline Coloring-Matters.

Of these substances, recently so highly recommended by Prof. Stilling for the treatment of wounds, obstinate ulcers, etc., under the action of which they disappear with almost magic quickness, only two have been tested, *Methylviolet* and *Methyleneblue*. Neither of these substances has the slightest preservative action, nor did they penetrate the pulps to a depth of more than a quarter of an inch. Pulps treated with either the pure substance or with the concentrated alcoholic solution soon showed signs of putrefaction, and became enveloped in a growth of bacteria when transferred to the agar plate (Fig. 7, *c*, *d*).

Campho-phenique.

This antiseptic has scarcely been tested often enough to admit of forming a proper estimate of its value. It appears to penetrate the tissue about as rapidly as carbolic acid, producing a delicate pale color and moderately hardening the tissue. The pulp also acquires antiseptic properties by the absorption of the solution, but not, as far as my experiments have shown as yet, equal to that imparted to the pulp by carbolic acid alone.

I have at present a large number of other antiseptics under observation, the value of which I can estimate only approximately. Of these, the cyanide of mercury appears quite equal to the bichloride in its permeating and preserving action ; resorcin, thallin, sulphocarbolate of zinc, oil of birch, acetico-tartrate of aluminium, etc., all show sufficient action to encourage further investigation of them, while eucalyptus oil, iodol, tincture of iodine, spirits of camphor, naphthaline, and some others showed so little action that I shall not consider them further. The antiseptics which I have thus far experimented with may accordingly be arranged in the following classes :

1. *Those pre-eminently active in preventing decomposition of pulp-tissue :*

Bichloride of mercury, cyanide of mercury (?), trichlorphenol, sulphate of copper, phenol (carbolic acid), oil of cloves, chloride of zinc, campho-phenique (?), hydronaphthol (?).

2. *Those of doubtful value :*

Thymol, salicylic acid, eugenol, α- and β-naphthol, acetico-tartrate of aluminium, 5 per cent. solution of bichloride of mercury, and possibly some essential oils.

3. *Those nearly or quite worthless :*

Iodoform, basic aniline coloring-matters, borax, boracic acid, chloride of lime, peroxide of hydrogen, sozoiodol salts, iodol, tincture of iodine, spirits of camphor, naphthaline, the double cyanide of mercury and zinc, and many essential oils.

Resorcin, thallin, sulphocarbolate of zinc, oil of birch, iodide of sodium, nitrite of sodium, and some other substances have not yet been sufficiently tested to permit of forming an estimate of their value, though some of them seem to promise well.

The reader should not attempt to form an estimate of the value of any particular antiseptic from an examination of anyone of the plates illustrated above. It is sometimes necessary to study numbers of such plates before a definite conclusion may be arrived at.

I wish, in conclusion, to call attention only to a subject which I shall present more fully at another time, viz, the unstability of antiseptic compounds. Many labor under the supposition that an antiseptic placed in the cavity of a tooth or in a root-canal and sealed in with a water-tight substance remains unchanged and retains its antiseptic action indefinitely. This, I fear, is a great mistake.

Some substances act only in virtue of their own dissolution, and in the same degree as they act they lose the power to act further and eventually become completely inert. Peroxide of hydrogen is a well-known example of this class. It cannot act without giving up its extra atom of oxygen, and in doing so it becomes simply water, an inert substance. Now, without having made a thorough study of this question, I am convinced that a similar loss of power is suffered by nearly all if not all antiseptics in the course of time. I have found that threads of cotton saturated with concentrated carbolic acid and brought into root-canals some months or even weeks later had completely lost their antiseptic action ; particularly was this the case where there was a large open foramen. Which of the antiseptics otherwise adapted to the treatment of diseased teeth retains its antiseptic action for the greatest length of time, is a subject well worth a thorough investigation. Antiseptics applied to cavities of decay on cotton naturally retain their power but a few hours. Pledgets of cotton saturated with carbolic acid and placed in large cavities near the gums were found not only to have lost their antiseptic action in twenty-four hours, but when placed on sterile plates of agar-agar they became the center of an extensive bacteritic growth.

TREATMENT OF FRACTURES OF THE MAXILLAE.

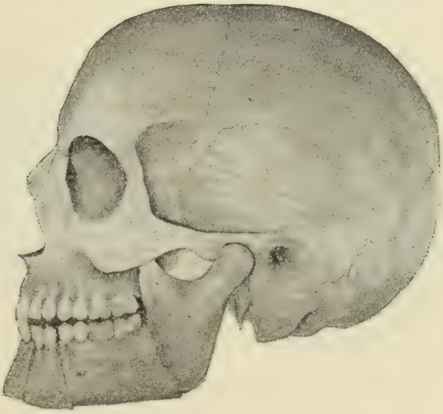
BY KASSON C. GIBSON, NEW YORK, N. Y.

THAT the best results possible may be obtained in the treatment of fractures of the maxillæ necessitates, on the part of the operator, a correct understanding and appreciation of the normal relations of the jaws and teeth. It is therefore important that the dental practitioner should add to his general knowledge the basal principles involved in the treatment of such cases, and at least a theoretical familiarity with the appliances best calculated to promote the comfort of the patient and to secure the best results.

The general surgeon encounters considerable annoyance in the treatment of fractures of the maxillæ, but, beyond contradiction, dentists are peculiarly fitted to overcome the mechanical difficulties. While in the treatment of fractures of the maxillæ the services of a surgeon are invariably sought, yet the most approved appliances and the best methods of treatment have emanated from dentists. Reflection upon the anatomy of the lower jaw will convince anyone of the difficulties to be encountered in reducing a fracture and retaining the fragments in their normal positions. It is possible ordinarily to construct an interdental splint which will so hold them and at the same time permit the jaw to be used for the reception and mastication of food.

Fractures of the jaw are unmistakable, the prominent symptoms and signs being pain, swelling, drooling, hemorrhage (if compound), displacement of the teeth, mobility of the fragments, and crepitus. When any doubt exists as to the location of a fracture of the lower jaw, grasp the bone on each side, with the forefingers introduced into the mouth and resting upon the teeth, when there will be no difficulty in recognizing the false point of motion or crepitus between the fragments. In fractures of the upper jaw, introduce the thumbs instead of the forefingers.

FIG. 1.



Fractures are simple when the bone only is divided without piercing the integuments; compound, when the injury is accompanied by laceration of the tissues, through which there is a communication between the external air and the fracture; comminuted, when the bone is broken or crushed into several pieces at the same point and communicating with each other.

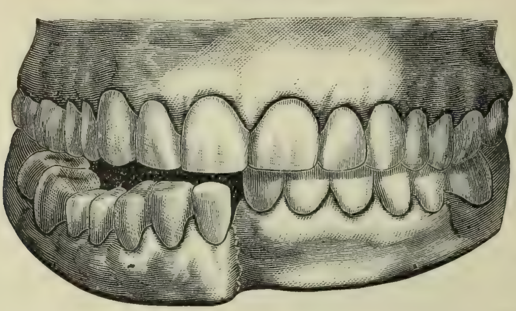
Fractures of the lower jaw, if the body of the bone is involved, are almost always compound in the direction of the mouth; but when the ramus, coronoid process, or condyle are fractured, the bone is too deeply seated for the injury to extend into the mouth, unless caused by a gunshot or missile.

Fig. 1 represents a compound fracture of the lower jaw, the line of fracture extending through the body of the bone as follows: first, to the left of the symphysis, between the central and lateral incisors; second, between the cuspid and first bicuspid; third, back of the last molar. This variety is usually caused by a blow on the side of the face, and is exceedingly difficult to reduce and retain in position while introducing the splint.

Teeth that are loose or fractured should not, as a rule, be extracted, for in time they often become firm and useful. Those with the pulp exposed ought, if possible, to be removed or the pulp destroyed, otherwise their presence will cause unnecessary pain.

The fundamental principles inculcated by Drs. Gunning and Bean (dentists), of taking impressions of both jaws and reconstructing the model of the fractured jaw by articulating the teeth to the cast of the unbroken jaw, and making with vulcanite a splint on the reconstructed model, has been adopted.

FIG. 2.



Any attempt to reduce the fracture previous to taking the impression will inflict needless pain, as it is impossible, as a rule, to bring the fragments into perfect apposition and retain them while an impression is being taken; nor is it desirable, as this can be accomplished when readjusting the plaster model.

Before taking an impression of the fractured jaw, remove any tartar about the teeth, for the better adaptation of the splint as well as of ligatures, if the latter should be required. Impressions of both upper and lower jaws will be required; for this purpose there is no material so suitable as plaster of Paris; modeling composition, however, may be employed for the uninjured jaw.

Obtain an impression of the uninjured jaw first, thus gaining the confidence of the patient. The impression of the fractured jaw should include the entire jaw and all of the teeth; where this is not possible, take a special impression of the displaced fragments. After obtaining both impressions, make a careful examination of the fractured jaw, to ascertain, if possible, the pressure required to replace the fragments in their normal position and to hold them there. The displaced fragments, as shown in the cast, must then be separated; next, accurately articulated to the upper teeth and the fragments cemented in proper position with plaster of Paris.

Fig. 2 represents a fracture at the symphysis. Fig. 3 represents the displaced fragment sawed from the cast (Fig. 4).

The occluding or grinding surfaces of antagonistic teeth are unmistakable, and there is no excuse for making an error in resetting the plaster model. Should any discrepancy occur, it will be fatal to the success of the appliance. In all cases where there are teeth which occluded with those of the opposite jaw (previous to the fracture) a mistake is impossible, if care be exercised.

FIG. 3.

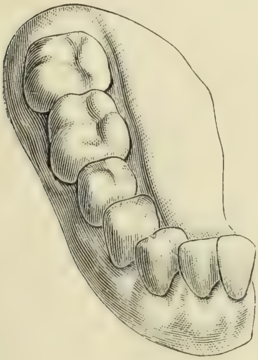


FIG. 4.

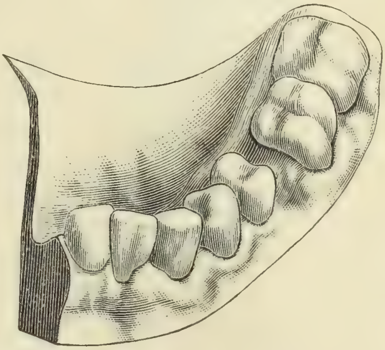
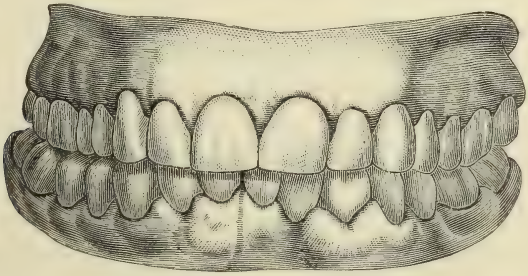


Fig. 5 shows the plaster fragments placed in their normal position and cemented together, ready for the articulator.

FIG. 5.



In fractures where the teeth are missing, take an impression of the alveolar ridge in the same manner as for artificial teeth, and there will be no difficulty in correcting the model. The splint should be molded with wax on the reconstructed plaster cast, and must embrace each fragment of the jaw. If to be used for mastication, the splint should cover all the teeth.

After modeling the splint in wax, and just before removing the cast for flasking, soften the wax with dry heat. (The grinding-surface of the teeth should have been previously oiled to prevent their adhering.) Then close the articulator, forcing the grinding-surface of the upper teeth into the wax, thus giving a uniform grinding-surface. Before packing the rubber, cover the teeth and model with two or three thicknesses of tin foil. There are two reasons for doing this: first, it makes the splint a trifle larger; second, it gives a clean surface. After vulcanizing, immerse the splint in diluted muriatic acid to dissolve the tin. Interdental splints ought to be so adjusted that mastication can be performed.

In many fractures of the lower jaw it will be impossible to hold the fragments in the splint, in their normal relations, by merely attaching them to the splint. In these cases the appliance must be supplemented by an external metal compress, so attached to it that the jaw will be held as in a vise. The tightening of this compress forces the fragments into the splint and securely holds them.

Fractures of the upper jaw require but little treatment compared with those of the lower, since the bones are naturally immovable, and there is little difficulty in keeping the fragments in position.

The length of time necessary for wearing an interdental splint is variable; the shortest time, however, being about three weeks.

Brief histories of the following cases are furnished as illustrating the different methods and appliances used by me in the treatment of fractures of the maxillary bones:

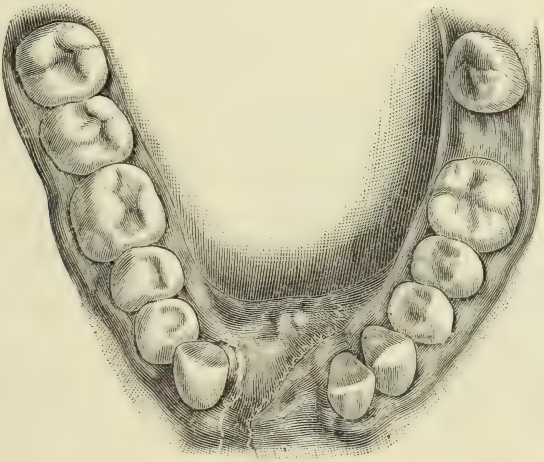
Case 1.—Male, aged fifty. Treated at Bellevue Hospital, 1870. Lower jaw fractured on the left side, the line extending through the body between the cuspid and first bicuspid. The displacement of the posterior fragment was downward and outward. No displacement of the right side.

The splint used for this patient was made of vulcanite, covering all the teeth, and held in position by first tying ligatures to the teeth and afterward to the splint. The holes on the grinding-surface were for two purposes: first, to ascertain if the teeth were in proper position; second, to introduce the nozzle of the syringe for cleansing. After reducing the fracture and adjusting the splint, the patient was enabled to masticate without any difficulty. The splint was worn about four weeks, and on its removal occlusion of the teeth was found to be correct.

Case 2.—Male, aged thirty-five. Treated in Bellevue Hospital, 1870. Lower jaw fractured in two places: on the right side between the lateral incisor and cuspid, and on the left of the symphysis, between the central and lateral incisors. Two incisors on the right side and one on the left side had been knocked out at the time of the injury. The anterior fragment was forced back and downward under the tongue; the left side of jaw displaced downward and inward. (See Fig. 6.)

A splint similar to the one just described was applied, except that after inserting the splint and reducing the fracture a chin-piece of gutta-percha (the impression-material now used by dentists is much better), padded with cotton, held in position with a four-tailed bandage, was added. Nourishment was taken through a space left in the splint. (See Fig. 7.)

FIG. 6.



After a few days it became necessary to remove the chin-piece, as the patient complained of soreness and pain. It was then discovered that an abscess had formed on the left side of the symphysis. This, on being opened and probed, was found to contain a small piece of bone, which was removed. The parts were cleansed with a solution of carbolic acid and glycerine, the cotton padding renewed, and the chin-piece reapplied. This was frequently removed for renewing the cotton and for treatment of the abscess, which healed in a few days. About this time a second abscess formed under the splint, near the

FIG. 7.

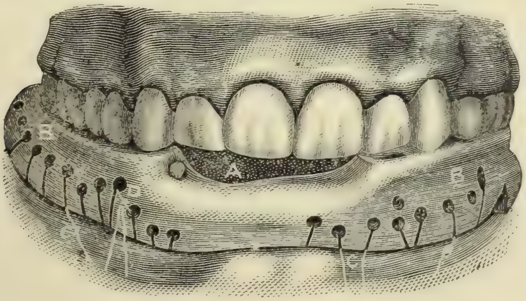


FIG. 7.—A, space through which nourishment was taken; B, B, holes and slots for tying the ligatures to the splint, these having been previously tied around the teeth. These holes were also used for introducing the nozzle of a syringe for cleansing; C, C, ligatures; D, ligature tied.

symphysis. This, on being opened, contained a piece of alveolar process, which was removed. Later several other pieces of alveolar process presented themselves at or near this opening, and were removed. At the end of three weeks the union of the fragments was sufficiently firm to permit of the removal of the chin-piece, allowing the use of the jaw for mastication. The bandage, however, was retained, except when nourishment was being taken. The splint was removed after being worn about six weeks, when occlusion of the teeth was found to be correct.

Case 3.—The patient, a miner, aged twenty-seven, was admitted to Bellevue Hospital May 2, 1872. Three days before admission he was injured by a splinter of wood from an explosion of nitro-glycerine. Examination revealed a compound comminuted fracture of right half of inferior maxilla. There were three points of fracture : first, between the left lateral incisor and the cuspid ; second, between the bicuspids ; third, at or near the angle of the jaw ; considerable displacement of all the fragments.

The anterior fragment, containing three incisors, the cuspid, and first bicuspid, was depressed half an inch and displaced backward. The middle fragment, including the second bicuspid and three molars, was carried up nearly to the median line and slightly backward. The posterior fragment was slightly elevated.

A splinter of wood about a half-inch long had been extracted from an external wound which extended inward from the symphysis for an inch and a half along the line of the jaw. A clot of blood occupied the left side of the floor of the mouth ; there was also considerable swelling about the face. The patient swallowed with difficulty, fluids escaping through the nose ; articulation very indistinct.

May 3. Patient partook of milk through a glass tube with less discomfort than the day before.

May 4. Patient still unable to swallow with ease, although the swelling had greatly subsided. An attempt was made to introduce the stomach-pump, but patient would not submit. In the afternoon Prof. Stephen Smith saw him and advised wiring the anterior fragments in order to draw and retain the tongue forward. This was accomplished, though not without some difficulty, and the patient drank two glasses of milk. About two hours later the wire broke, but the patient was able to swallow as well as before, although complaining of pain during the act.

May 5. Patient took three cups of coffee. Fragments again wired in position.

May 6. Patient swallowed all the food he wished. Wire failed to hold fragments in place.

May 7. Swelling had almost disappeared. Odor from the mouth was very offensive.

May 9. Large fragment of the jaw, containing one bicuspid and two molars, became detached during the night. The third molar also came away, together with a piece of granite about the size of a pea (Fig. 8). Treatment up to this time consisted of disinfecting the mouth with a solution of carbolic acid and glycerine. The wound was also dressed with the same, and the jaw supported with a four-tailed bandage.

FIG. 8.

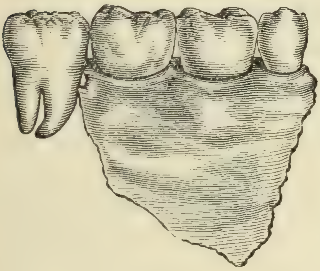


FIG. 9.

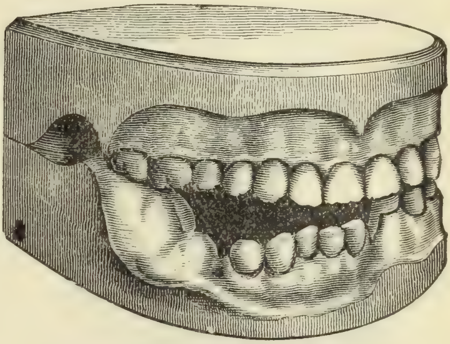
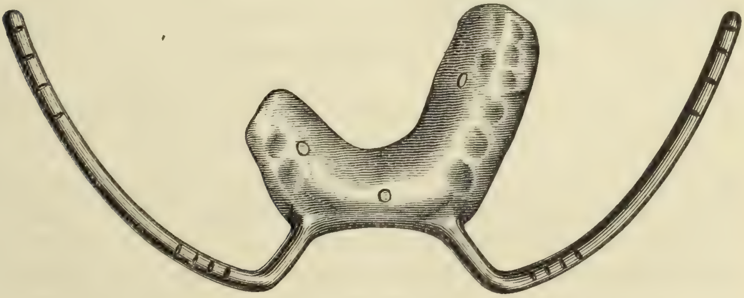


FIG. 9.—Model showing displacement.

May 15. Impressions were taken in plaster of Paris preparatory to making an interdental splint (Fig. 9). This was constructed similar to those already described, with the addition of two steel wires (old excavators) vulcanized in the splint and curved upward as they emerged from the corners of the mouth, thus avoiding pressure on the lip, and extending backward nearly to the angle of the jaw (Fig. 10). A rubber band was substituted for the bandage, and extended from one steel wire under the jaw to the other, outside of the gutta-percha chin-piece.

FIG. 10.



May 19. Interdental splint adjusted (Fig. 11). Patient removed this five hours later, on account of considerable pain on the right side of the symphysis.

May 20. A very tender induration appeared posterior to and below the cuspid and first bicuspid of the right side. On opening this, a small piece of bone was found and removed.

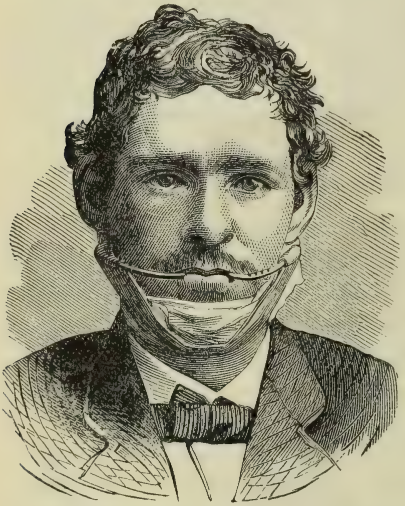
May 21. Splint readjusted. Patient ate and slept well.

May 23. Splint again removed by patient, as he could not endure the pressure. Bandage applied, which imperfectly held the fragments.

May 28. Interdental splint readjusted and fragments placed in position. Wound under the chin nearly healed.

During a period of ten days after the readjustment of the appliance, it was found necessary to occasionally remove the chin-piece for some hours, owing to extreme pain and tenderness of the external surface. Cotton and a bandage were temporarily substituted for the chin-piece and rubber band. Both pain and tenderness were partly caused by the pressure requisite to retain the fragments and splint in position. The splint was constantly worn, except at such times as were necessary to remove it for cleansing. After two months, firm union was found to have taken place, and occlusion of the teeth correct. This case appears in an article written by Dr. N. W. Kingsley, published in *Johnston's Miscellany* in January, 1874, from which I quote the following: "The impressions and the making and adjustment of this splint was done by my assistant, Dr. K. C. Gibson." It is also embodied in Kingsley's "Oral Deformities," pages 402, 403.

FIG. 11.



Case 4.—Male, aged about sixty. Admitted to Bellevue Hospital, 1870. Lower jaw fractured on the right side, between the bicuspids. Previous to admission to hospital he had been treated with gutta-percha covering the teeth, and a four-tailed bandage. About four weeks after the accident these were removed, as union had taken place, but upon examination all the teeth to the left of the fracture, back to the wisdom-tooth, were found to be displaced downward from one-half to one-fourth of an inch (Fig. 12).

Impressions were taken, and a splint made similar to that described in Case 3. The patient was etherized and the jaw refractured at the same point. The splint was adjusted and held in position as in

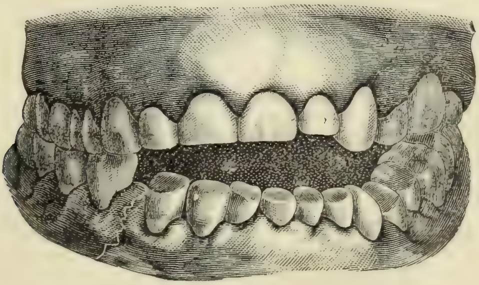
Case 3. About twenty-four hours after the adjustment of the appliance, the patient complained of numbness extending from the point of fracture to the symphysis. On examination, after the removal of the chin-piece, it was thought that the numbness was due to an injury of the nerve at or near the mental foramen. It remained for some weeks, but eventually normal sensation was regained.

The splint was worn with comfort for six weeks, the chin-piece being occasionally removed for the purpose of cleansing. Occlusion of teeth was found correct at this time.

Case 5.—Male, aged thirty. Treated at Bellevue Hospital, 1872. Lower jaw fractured at the symphysis. The left central incisor, being loose, was removed. The right fragment was displaced downward and inward ; the left inward.

The splint used in this case was similar to the one last described, except that for the steel wire, gutta-percha chin-piece, and rubber band, an external metal compress was substituted. This was constructed from a saw-frame such as is used by mechanical dentists (Fig. 13). To this was attached a revolving brass chin-piece (Figs. 14, 15) ; this was padded with spongio-piline covered with oiled silk (Fig. 16). The splint was worn four weeks, when occlusion of the teeth was found to be correct.

FIG. 12.



This external metal compress was found to be simpler in its construction, more readily applied, and more effective. The chin-piece should be made of any size or form the case may require. If there are external wounds or abscesses, holes should be cut in the chin-piece corresponding with these, thus permitting drainage and treatment.

For the reduction or retention of any fracture of the lower jaw with much displacement, and where external pressure is required, this form of splint will prove as effective as any appliance that may be employed. When used, it is not always necessary to completely reduce the fracture at the time of introduction. The use of the jaw for masticating will gradually cause a proper adjustment of the teeth to the splint.

Case 6.—Male, aged about forty. Lower jaw fractured at the symphysis. Left side displaced downward about one-fourth of an inch and carried inward. Appliance similar to that last described. Fracture reduced without any difficulty. After wearing the splint four weeks, occlusion of the teeth was found to be normal.

Case 7.—Male, fifty-two years of age; while assisting in launching a ship, March 1, 1873, was struck by a heavy bar across the left side of the face. Admitted as a patient to Bellevue Hospital.

Examination revealed a lacerated wound an inch long, situated three-quarters of an inch above the right angle of the mouth. The lower jaw was fractured in three places: first, at the end of the symphysis, between the central and lateral incisors; second, at the right of the symphysis, between the central and lateral incisors; third, at the angle back of the last molars, right side. The anterior fragment was displaced downward and backward, and the large fragment on the right, containing six teeth, was depressed at the anterior end, much elevated at the posterior. No displacement of the left side of the jaw.

FIG. 13.

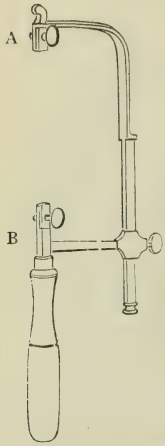


FIG. 13.—The handle and the parts marked A, B, were removed.

FIG. 14.

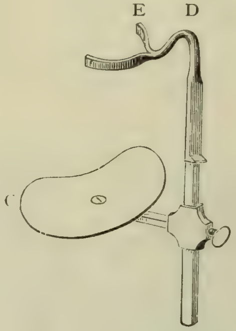


FIG. 14.—C, revolving brass chin-piece. The rod at D, the point of contact with the lips, is made round to avoid irritation, and at E is split and bent to nearly conform to the contour of the jaw and teeth. To this (E) is attached the vulcanite.

FIG. 15.

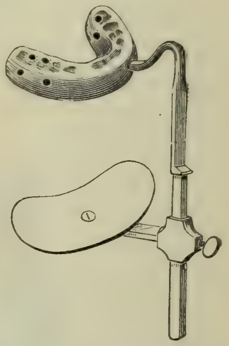


FIG. 15.—Vulcanite attached. The top holes serve for ascertaining if splint and fragment are in position; the side holes are for cleansing.

The wound in the lip was closed with silk sutures, and a four-tailed bandage applied to the jaw, but a few days' trial proved its inefficiency. Impressions were then taken for an interdental splint. Upon removing impression of the upper jaw, this also was found to be fractured as follows: first, from behind the second bicuspid on the right side across the roof of the mouth, through the alveolar process on the left side, where the first molar had been extracted, then around in front, above the teeth, to the right side; second, between the central and lateral incisors of the right side, running along the median line and intersecting the fracture before described (Fig. 17). The two fragments containing all the teeth anterior to the molars were slightly displaced. These fractures were readily readjusted and held with ligatures.

FIG. 16.

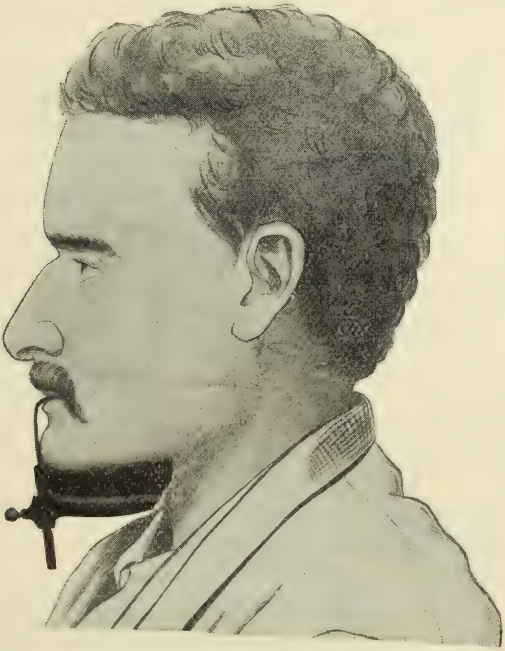
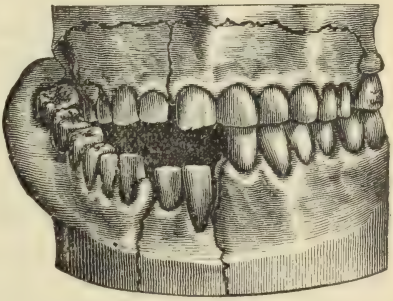


FIG. 16.—Appliance in position (from photograph of patient).

For the lower jaw the splint similar to that used for Case 5 was applied March 9, with the exception that the tongue-holder or duct-compressor (used by dentists) was substituted for the saw-frame; the chin-piece padded with spongiopiline covered with oiled silk. From that date the patient experienced no discomfort, and ate the ordinary hospital food without difficulty (Figs. 18, 19). On March 20 he was discharged from the hospital, and on April 10 the splint was removed. No deformity remained.

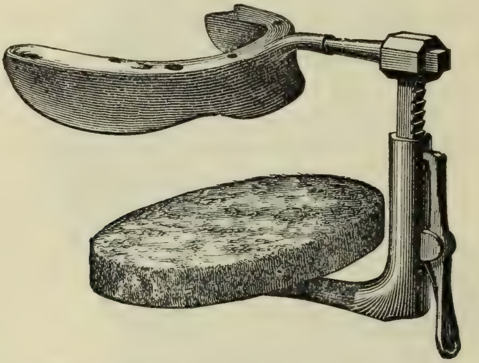
FIG. 17.



This case appears in Dr. N. W. Kingsley's article published in *Johnston's Miscellany*, February, 1874, also in his work on Oral Deformities, pages 405, 406, and 407. I quote the following from *Johnston's Miscellany*: "The impressions, cast and adaptation of this instrument were made by my assistants, Messrs. Gibson and W. H. Kingsley."

The duct-compressor had been previously used by me as a part of an interdental splint in a number of cases.

FIG. 18.



Case 8.—1875. Patient, a policeman, aged thirty-five. Lower jaw fractured on right side, between second bicuspid and second molar; the first molar having been extracted, third molar missing. An attempt had been made to reduce and hold the fracture by covering the teeth with gutta-percha and supporting the jaw with a four-tailed bandage.

FIG. 19.

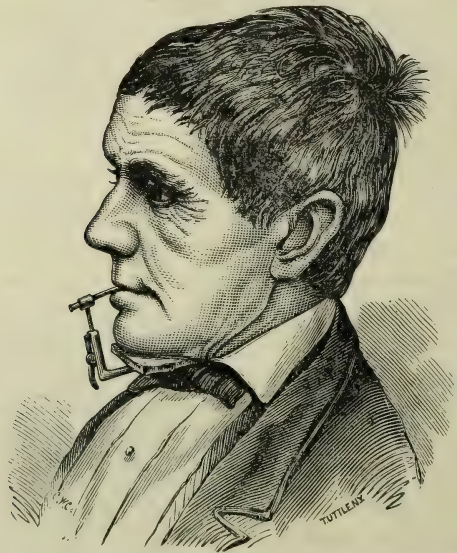


FIG. 19.—Appliance in position (from photograph of patient).

Twenty days after the injury was received, on taking impressions for an interdental splint, it was discovered that there was no actual displacement of the anterior fragment, but the posterior one, including the second molar, was elevated about three-fourths of an inch, the tooth coming in contact with the third molar on the upper jaw. The treatment was similar to that used in Case 7, and the fracture was reduced without any difficulty. The splint was worn with comfort for thirty days. On removal, the teeth occluded correctly.

Case 9.—1878. Male, aged about twenty-five, subject to epileptic convulsions. Fracture due to a fall during one of these attacks. The lower jaw was fractured at the symphysis ; right side displaced downward about one-fourth of an inch ; anterior end of fragment outward ; posterior portion of jaw inward about one-fourth of an inch. No displacement of left side of the jaw. (See Fig. 2.) An attempt had been made to reduce and hold the fragments in position with gutta-percha covering the teeth, and a four-tailed bandage.

FIG. 20.

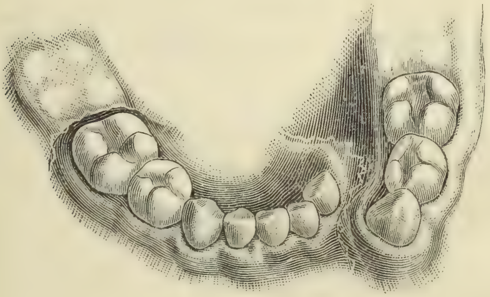
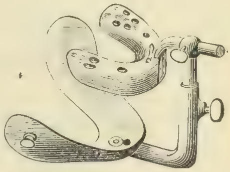


FIG. 21.



Two weeks after the accident impressions were taken for an interdental splint, which was applied April 3. The fracture was reduced without any difficulty. The splint was worn with comfort, and on May 9 it was removed, occlusion of the teeth being correct. A few minutes after the removal of the splint the patient had an epileptic seizure, although he had been free from these attacks during the treatment for fracture. Appliance similar to Case 8.

Case 10.—Patient, a boy, aged six. Two fractures of the lower jaw. First, between the lateral incisor and cuspid, left side ; second, back of last temporary molar on right side. Displacement of anterior fragment downward and inward, each about one-fourth of an inch ; slight displacement of posterior fragment ; no displacement of left side (Fig. 20). The splint used was similar to the one in Case 7, with necessary alterations (Fig. 21). This will be more fully explained at the end of the article, in the description of the splint adopted for all cases where an external metal compress is required.

Attempts had been made to reduce and hold the fragments, first, with ligatures about the teeth; second, with gutta-percha covering the teeth and a bandage, neither of which proved effectual.

Three weeks after the accident, August 22, 1878, an interdental splint was adjusted. Great difficulty was encountered in reducing this fracture. A few days later, the reduction not being satisfactory, the splint was removed, nitrous oxide administered, fracture reduced, and splint replaced. The splint was worn about five weeks. On removal, the anterior fragment was found to be slightly displaced downward and inward.

Case 11.—1878. Male, aged fifty. Lower jaw fractured on right side, between the cuspid and first bicuspid; the left side displaced downward about one-fourth of an inch.

Appliance similar to Case 8. Fracture reduced without any difficulty. The splint was worn about four weeks. On removal, occlusion of the teeth was found correct.

Case 12.—Patient, male, aged forty-seven. Three fractures of the lower jaw: first, at the symphysis, left lateral incisor knocked out at time of injury; second, at the left side back of second molar, third molar having been extracted several years before; third, at neck of the condyle.

Displacement of anterior end of the anterior fragment downward and inward about one-fourth of an inch. The posterior end was carried outward about one-fourth of an inch at last molar. Very little displacement of the posterior fragment. Displacement of the fragment at neck of the condyle outward. Right side of the jaw not displaced. Several attempts had been made to reduce and hold the fragments in their normal position.

Three weeks after the accident, impressions were taken for an interdental splint. Two days previous to this two external abscesses were opened,—one on a line with the second molar, and under the jaw, the other about half an inch in front of lobe of the ear on left side. Pieces of bone were removed from these. The splint was similar to the one used in Case 8.

An impression of the entire external surface of the lower jaw was taken. Dies were cast in zinc and lead, and a chin-piece swaged out of brass, which extended from the angle of the jaw on the right side around underneath the chin to the left side, including the three fractures (Fig. 22). Pieces were cut out of the chin-piece at A A, opposite the abscesses, for drainage and treatment.

The patient was etherized, the fracture reduced with great difficulty, and the splint adjusted. The fragment near the condyle was held in place by a thumb-screw set in the chin-piece at B, opposite the point of fracture. To this was attached a hard rubber pad about the size of a twenty-five-cent piece, to reduce and hold it. For days after the application of the splint the patient suffered severe pain. The chin-piece was occasionally removed for the purpose of cleansing and repadding. At the end of six weeks the splint was removed, union having taken place with a slight displacement downward and inward at the symphysis.

Case 13.—Male, aged thirty-six ; accident due to a fall. Lower jaw fractured on right side between lateral incisor and cuspid. Displacement on right side outward about one-fourth of an inch at point of fracture. No displacement of left side.

Twelve days after the accident, impressions were taken for an interdental splint. This was made of vulcanite, fitting the lingual surface of the teeth, extending downward about one-fourth of an inch below the necks (Fig. 23).

On the left side the first bicuspid and second molar were missing. A gold clasp was made fitting the posterior and lingual surfaces of the second bicuspid. Gold wire was vulcanized in the splint, fitting the lingual surface of the cuspid on the left side, and extending along the buccal surface of the cuspid and incisor to a point nearly corresponding to the fracture, and then bent to form a hook. On the right side gold wire of the same size was vulcanized in the splint at the lingual surface and around the posterior surface of the second molar (third molar missing), and extending along the buccal surface of the molars and bicuspids, terminating in a hook within one-fourth of an inch of the hook on the left side.

FIG. 22.

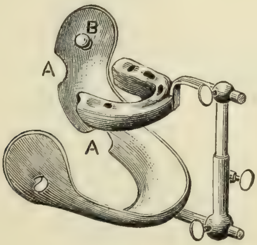
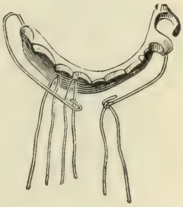


FIG. 23.



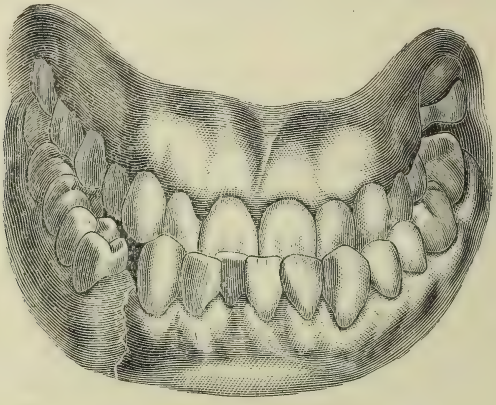
Ligatures were passed through two holes in the splint opposite the necks of the first and second bicuspids respectively, and tied. The splint was then introduced, the fracture reduced, and ligatures from the plate tied around the first and second bicuspids. The splint was accurately held in place on the left side by the clasp around the second bicuspid. A ligature was tied in the hook on the left side and caught in the other hook and tied, thus bringing the two hooks nearly together.

The patient had no difficulty in masticating after introduction of the splint. About ten days after adjustment an abscess which caused much pain appeared under the chin, to the right of the symphysis. On opening the abscess there was a free discharge of pus, and on probing a small piece of bone was found. A second abscess appeared a few days later near the point of fracture, below the lateral incisor. On opening, a piece of alveolar process was found. Both abscesses healed in a few days. The splint was worn six weeks, at which time the occlusion of the teeth was correct.

Case 14.—1873. Female, aged seventy. Lower jaw fractured on the right side, at a point corresponding with the cuspid. Displacement of posterior fracture downward and inward ; had worn a full set of upper teeth, also a lower set, on gold, for twenty-five years.

Three days after the accident the six front teeth were removed from the upper plate and the two plates united by gold wires soldered to the plates at points corresponding with the cuspids.

FIG. 24.



The plates were adjusted to the mouth, the fracture reduced and held in place with a four-tailed bandage. Nourishment was taken through an opening formed by removal of the teeth. Four weeks after, union having taken place, the plates were removed and the teeth replaced in position and soldered.

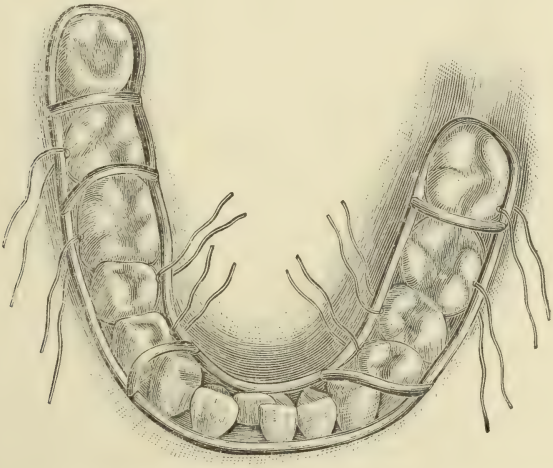
Case 15.—Lower jaw fractured on the right side, between the cuspid and first bicuspid. Displacement of left side of the jaw outward ; none on the right side. The normal occlusion of the jaws showed that the incisors and cuspids of the lower jaw shut outside of those on the upper jaw (Fig. 24).

The splint of iridium wire was constructed so as to fit the buccal and lingual surfaces of all the teeth at the necks, and the ends joined by soldering. On the right side wire of the same size was soldered, extending from the buccal to the lingual surface, over the grinding-surface between the cuspid and first bicuspid. Similar wires were attached between the first and second and second and third molars ; and on the left side between the cuspid and first bicuspid, first and second molars. The last molar was missing. The object of these wires was to prevent the splint from working down into the gum and causing irritation, loosening, and elongation of the teeth (Fig. 25).

To hold the splint in position strong linen thread was tied around all the bicuspids and molars, and the thread in turn fastened to the buccal and lingual surfaces of the splint. Small platinum or silver wire may be used instead of the thread.

In this form of splint advantage should be taken of any space between antagonistic teeth, in adjusting the wires, passing them from the buccal to the lingual surface. Should the wires interfere with occlusion, all the teeth and the splint must be covered with gutta-percha.

FIG. 25.



Case 16.—Fracture of lower jaw, right side, between second and last molars ; displacement of posterior fragment upward about one-fourth of an inch. Appliance similar to the one used in Case 15.

A hook, made of the same sized wire as the splint, was soldered to the buccal surface of the splint opposite the last molar. The corresponding tooth on the upper jaw was missing. The hook was to reduce and retain the fragment. The splint was held in position with ligatures (Figs. 26, 27).

Case 17.—Fracture of lower jaw, right side, back of first molar ; second and last molars missing. Posterior 'fragment elevated about one-fourth of an inch. Splint similar to the one previously described, with the addition of rubber vulcanized to cover the jaw where teeth had been extracted. This rubber extended down about one-eighth of an inch on the buccal and lingual surfaces (Figs. 28, 29).

Case 18.—Fracture of lower jaw, right side, back of third molar. Posterior fragment elevated about one-fourth of an inch. Splint similar to the one used in Case 15, with the addition of an iridium wire spike soldered on the end of the splint back of the last molar.

FIG. 26.

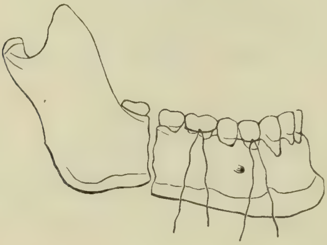
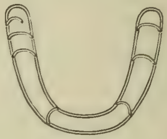


FIG. 27.



The spike (of the same length as elevation of the fragment) was forced through the tissue to the bone, reducing and holding the fragment (Figs. 30, 31).

Case 19.—Bellevue Hospital, September 1, 1871. Boy, aged nine, kicked by a horse. Nasal bones fractured and removed. Upper jaw separated at median line. Left side forced backward and downward in the pharynx. Quills were placed in the nostrils to enable the patient to breathe. The upper jaw contained only six permanent teeth,—four incisors and two sixth-year molars,—badly decayed, with some roots of temporary molars.

FIG. 28.

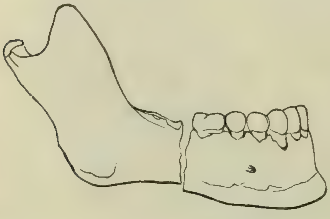


FIG. 29.

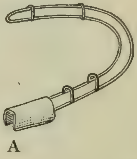


FIG. 29.—A, vulcanite attachment.

FIG. 30.

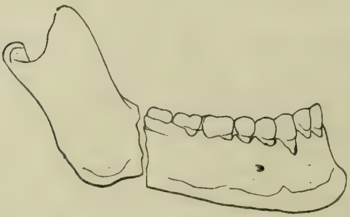


FIG. 31.

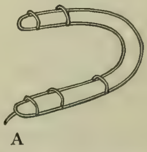


FIG. 31.—A, spike.

The splint was made of rubber, covering the roof of the mouth, including the sixth-year molars and roots of the temporary teeth, extending up to and fitting the lingual surface of the incisors. Two steel wires (old excavators), vulcanized in the splint, emerged obliquely from the corners of the mouth for about one-half an inch, then bent backward to about one-half an inch in front of the lobe of the ear, then curved downward and outward (Fig. 32).

The splint was introduced and the fracture reduced. A bandage extending from the steel wire on the left, over the head, around the wire on the right side, back over the head to the left wire again, held the splint in position. A second bandage passed around the head, and was pinned to both sides of the bandage from the wire. The two incisors on the left side were of great assistance in holding the fragments in their normal position. On the day after adjustment of the splint, the patient was removed by his parents from the hospital. Twenty days later the splint was removed by a physician, and after three days more had elapsed the fragments were found to have united without any displacement.

The following form of appliance has been adopted as best meeting the requirements of cases needing an external metal compress (Fig. 33). It consists of three parts: first, a compressor; second, a chin-piece; third, an inner steel band or the wire splint described in Case 15 (Fig. 25).

FIG. 32.

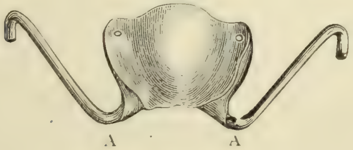
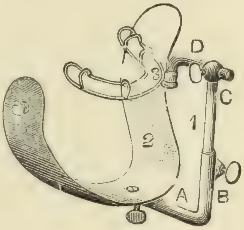


FIG. 32.—A, A, Steel wires.

FIG. 33.



First, the compressor (used without alteration for all cases), consisting of a horizontal rod (A) and a vertical rod (B), each about two inches in length, meeting at right angles. Rod B is hollow, and at its upper end is fitted a thumb-screw so adjusted as to hold at any point in it a movable rod (C), thus regulating pressure. Passing horizontally through a bulb at top of rod C is a rod (D) three inches in length, bent downward at right angles for about an inch. One-half of this lower end is smaller in diameter than the other half, leaving a shoulder. A thumb-screw in the bulb admits of the adjustment of rod D at any angle.

Second. The chin-piece is attached to the compressor by a thumb-screw, so adjusted that it may be pushed backward and forward on the rod A, and at the same time affording a double rotary movement. The chin-piece is made in different forms, each peculiarly adapted to the location of fracture. (*a*) If fracture is at or near the symphysis, the chin-piece consists simply of a flat piece of brass placed directly under the chin; (*b*) if back of the cuspid teeth involving the molars, it should fit the chin extending back to the angle of the jaw; (*c*) if involving both the angle and the condyle, it must include the entire lower jaw, and extend to the line of the ear. A metal button (E) should be attached on each side of the chin-piece for use in attaching any necessary support. For support nothing surpasses a skull-cap, to each side of which can be attached a piece of elastic reaching to the chin-piece; this in turn can be fastened to the metal button by a ring sewed in the end of the elastic.

Third. The inner steel bands are made of various sizes and shapes to conform as nearly as possible to the contour of the jaw and teeth, and are vulcanized in the splint.

In using the wire splint described in Case 15, attachment to rod D is obtained by a socket soldered in the splint at the median line. As a rule, the wire splint gives sufficient strength to allow of gutta-percha being substituted for vulcanite.

This appliance has been so constructed that the external compress may be removed independent of the splint proper; temporarily where external wounds or abscesses need treatment; permanently where there is sufficient union to retain fragments.

Any irritation of the lips caused by the adjustment of the rod at the median line may be remedied by removing (the patient having previously closed the jaws firmly) the external compress and readjusting it at any point to the right or left.

CONCERNING SUPPURATIVE INFLAMMATION.

BY DR. G. S. DEAN, SAN FRANCISCO, CAL.

(Concluded from page 535.)

I PASS now to present in detail my object in reporting a case of quinsy. I have sometimes been accused of writing obscurely,—of leaving too much to be supplied or "thought out" by the reader. It has been said that I neglect to develop implications, and thus strain the attention of even the careful reader, while I leave the ordinary reader uninformed. This is certainly a serious fault. For, while every one ought to see all the implications of what he reads and hears and says, it is a fact that we all frequently fail to see even the plainest of them; the greatest discoveries are sometimes direct implications of our every-day beliefs and remarks. I therefore purpose stating *in extenso* what was in my mind at the time of writing the introductory paragraphs outlining the object of this report.

The first part of the introductory statement of purpose needs no amplification. I propounded a question which the dentist is often called on to answer : Is quinsy ever due, in whole or in part, to any form of dental disturbance? The answer was that, while dental reflexes may affect the tonsils, the agent (the important item in the causation) of ordinary purulent tonsillar inflammation is a product of putrefactive fermentation, and can therefore proceed from but one dental condition,—the foul pulp-chamber and canal.

I then indicated a belief that suppurative inflammation in the tonsil would be found etiologically similar to suppurative inflammation in the apical region—that examination of the former would tend to confirm our present hypothesis concerning the etiology of the latter ; which belief was subsequently justified.

I said that examination of the tonsillar disease might modify or extend our view concerning the alveolar affection. As regards modification of view, I referred mainly to the current doctrine that putrefactive poison, passing outward through the apical foramen, necessarily or immediately produces inflammation ; the implications of which belief (explicitly stated by some of our foremost writers) are (1) that, during quiescence or absence of inflammation, no poison is formed in the pulp-canal, or at least none passes through the foramen, and (2) that removal of the putrefactive matter from the canal removes immediately the tendency to purulent inflammation. Consideration of the latency of quinsy (which here means the temporary non-appearance of quinsy in spite of the presence of quinsy-poison), as shown in this case, must, it seems to me, when the etiological similarity of the diseases is recognized, lead us to deny the assumption that absence of inflammation at the root-apex conclusively proves absence of poison at that point ; it must lead us to connect apical pericementitis, as we have not yet done, with the state of the system, and with such external exciting causes as may produce changes in that state. Furthermore, consideration of the fact that, in the case reported, suppurative inflammation appeared some days after removal of the poison-cause (that is, after removal of the patient from the place where the poison was absorbed) must lead us to question whether it may not be possible that, after removal of the putrescent matter from the pulp-canal, there may remain for a time a periforaminal effect—whether the patient may not be for a time liable, in the absence of poison in the canal, to apical pericementitis from canal-poisoning. (Let me note here, lest any should say that the evidence is not sufficient to warrant my assurance of the latency of quinsy, that, in another case which came under my eye, an interval of at least three days between reception of poison and appearance of disease was practically certain. It is fair to add that there appears to be in quinsy a prodromic stage, marked in some cases by pain in the ear or "lameness" in the temporo-maxillary articulation; but, on the other hand, I believe that I have seen an interval of some days between cessation of exposure to the inflammation-producing poison and appearance of the first prodromic symptom.) So much for modification of view. With regard to extension, something has already been said. To modify a view is, normally, to extend it. But there is more beyond. That chronic poisoning may produce acute disease has been rendered probable; but, apparently, in certain subjects, chronic poisoning produces chronic disease. Here "state of the system" (using the phrase generically, as including diathesis, cachexia, temperament, and idiosyncrasy, as well as temporary condition) appears as the cause, not of incidence of disease, but of its character—as the determinant of the form which the disease shall assume. Moreover, when we open a pulpless tooth without adequate antiseptic precautions, we find that severe poisoning produces acute inflammation; and therefore it appears to us that, contrary to what we observe in infectious diseases (using the word "infectious" in its specific as distinguished from its generic signification), amount of poison (*cæteris paribus*) determines virulence. Is this appearance deceptive? In the case of quinsy here reported, connection between amount of poison and extent or virulence of disease may be seen in such a number of gradations as to render the causal relation almost certain.

Let me, for clearness, re-present the modified view which examination of a case like that here reported tends to produce. In this view the usual apical inflammation appears as a result, not necessarily immediate, of putrefactive poisoning. The inflammation appears in two main forms, the acute and the chronic. The chronic form appears as a result of mild poisoning, conditioned by a systemic type which may be called asthenic. The acute form appears in two etiological divisions: (1) the direct, resulting from the immediate action of a large quantity of poison; (2) the precipitated, resulting, like the chronic, from small or "slow" poisoning, which poisoning produces no apparent effect, but only a predisposition, the disease being brought on by a precipitant or excitant, and owing its intensity either to the type of the system, or to local cumulation of poison or its effect.

But "state of the system" (a convenient phrase, though, like charity, it covers a multitude of ignorances) is, in our view, a cause, not only of character of disease, but also of liability or resistance. On this matter (indeed, on systemic influence in general) so little is said by recent writers—the clinic is now so generally subordinated to the microscope—the tendency to confine the view to the micro-organism is so pronounced—that I may be pardoned if I am over-emphatic or even digressive in its presentation.

It is natural that at present the systemic factor in the production of inflammatory diseases should receive but slight acknowledgment, the reason being the same as that which leads us to regard Alaska as a small place and Pennsylvania as a large tract of country. The human mind, instinctively clinging to truth, attends to and magnifies the clear, and neglects and diminishes the vague. Mycological truth is comparatively clear; the microscope has been brought to bear on inflamed tissue and on the organisms whose excreta produce inflammation. Biological truth is, on the contrary, and is likely to remain, vague. I say that it is likely to remain vague, because it cannot be investigated with the physical microscope, and the intellectual microscope seems incapable of being brought to bear on it; while ethnology (or "sociology") presents no difficulty to the investigator,—is to-day a *terra incognita*, not because it is unexplorable, but merely because men have not yet learned to use the necessary instrument of intellectual investigation,—biology appears largely inexplicable, for the reason that there seem not to exist or to be capable of being produced the "extreme cases" required for its understanding; in mathematical language, while ethnology is an equation of the first degree, biology is an equation of the fifth—while reduction of the one to simplicity is easy, reduction of the other is difficult or impossible. Biology is a compound subject, and can therefore be understood only by analysis; and this analysis seems at present hopeless. Yet, though biological truth be vague, and though it is not likely to be rendered clear, we must not neglect it, but must endeavor to give it its full place in our nosology.

That "state of the system" plays a part in the production of inflammatory disease in general and of purulent pericemental inflammation in particular, will be openly denied by few. We all have cases showing this connection. "How rapidly my flesh heals now!" said a lady to me one day, after stating that my antiseptic measures were, in her judgment, as far as she was concerned, superfluous. She continued: "When I first came under your care, not only was healing slow, but every scratch inflamed, every bruise became an abscess; now, without receiving the smallest attention, my cuts and bruises disappear, giving no trouble." This lady, in constitution fairly vigorous and in outward appearance fairly healthy, came to me some years ago presenting acute pericementitis, for whose relief extraction was deemed necessary, and, later, presenting chronic peridental "soreness" after pulp-removal. I ascertained that she had been somewhat worn by confinement and exertion, and had been subjected to a sort of "scientific diet," and, attributing her ills to a condition combining the features which in extreme cases we call scorbutic and strumous, suggested, while performing such operations as seemed necessary, that benefit might follow a change in her manner of life. That a change has taken place in her system, is rendered extremely probable by the difference in results of non-dental irritations, for her statement concerning the ills of which cuts and bruises appeared to be excitants was not far from the truth. And there is or appears to be a similar difference in results of death of the tooth-pulp. For, recently (during pregnancies), two pulps have been lost, and, though the teeth have been neglected to a reprehensible extent, peridental disease has not appeared. No doubt, in the records of every practitioner, there may be found cases like this—cases almost demonstrating a primary causal connection between peridental inflammation and state of the system. It is not, of course, that severe poisoning will not produce inflammation even in the most resistant subjects. But it is that, under like circumstances, inflammation will occur in one condition of the system, and in another condition will not occur.

That inflammation-predisposing conditions may be permanent, is another proposition which will scarcely be denied. But, this being admitted, there comes a question which seems impossible of answer in other terms than those of itself. It is, What is the cause of systemic predisposition to purulent inflammation? Plainly, (1) irritants in the system (as in lithæmia, syphilis, purpura, and those unknown conditions which when severe manifest themselves by the external symptoms which are called "skin diseases"), acting as adjuvants or protectors to the inflammation-producing poison, may at times account for the predisposition; and (2) in complex organisms, apart from the incidents or accidents due to complexity (such as embolism or local segregation), asthenia or plethora, by favoring local stasis, may predispose; but (3) when all possible explanation of this kind has been exhausted, we have a large residual mass of phenomena, and of these we postulate as an explanation that which we are seeking to account for,—a tendency, liability, or non-resistance to inflammation. Thus, we assert that there are inflammatory "diatheses" and "cachexiæ" (some of which, purulent and non-purulent, we specify—as rheumatic, tuberculous, etc.); and, having made this statement, we are compelled to confess that "diathesis" and "cachexia" are words of the vaguest meaning,—often mere masks put on by sham learning to conceal its hollowness,—and, to complete our humiliation, we are obliged to admit that, instead of inferring unseen predisposition from manifest diathesis, we usually postulate unseen diathesis to account for manifest predisposition.

It is true that, by analysis (such as we are able to make), with its correlative synthesis, we reach conceptions of the complex organism wherein there are such co-existences as enable us to infer, with some probability, tendencies, inflammatory or otherwise. When we go down to the fundamental matter, the character of the cells or biological elements (although we are obliged to do here what we are not obliged to do with the chemical elements—attribute to the elementary unit something akin to that which we are seeking to account for in the system as a whole), we come, by synthesis, to the great truth which was seen and upheld by the humoral pathologists,—the truth of compound biological character or "temperament"; for, as the character of chemical elements determines the character of chemical compounds, as the character of individuals or social elements determines the character of nations or political compounds, so, assuredly, does the character of biological elements determine the character of complex organisms or biological compounds,—not the social or "moral" character, but the physiological character. It is customary to distinguish four basal physiological characters or "temperaments," one of these being marked by lack of recuperative power; and of this it used to be said, before the words "pathologist" and "microscopist" became synonymous, that it furnishes a condition favorable to pericemental inflammation or a liability such that this inflammation is produced by a comparatively mild agent,—which belief, clinic-born, is enforced by the experimental fact that different species of animals (which of course differ in the matter of biological character or "temperament") differ in reaction to drugs or poisons generally, and especially in resistance or non-resistance to inflammation-producing putrefactive poison. It may be added that, as it is impossible to draw the line between diathesis and temperament, so outwardly manifest diathesis (that is, diathesis which is practically temperament) furnishes, like temperament, fair ground for prediction concerning inflammatory liability in general, and tendency to pericemental inflammation in particular.

But, having said all this, it remains true that our biological conceptions are inadequate. We are, in fact, in biology, unable to perform that full analysis which is required to furnish the basis of knowledge; and, therefore, unable to adequately explain, we are unable to satisfactorily predict. Our prediction is still mainly and necessarily superficial or descriptive, as distinguished from fundamental or causal, and, therefore, though often just, it is rarely certain. We say, for instance, and we are probably right in saying, that a person of one of the systemic types rudely grouped together as "scrofulous" is predisposed to pericemental inflammation; yet we often see such a person carry pulpless teeth without trouble through all the shocks or excitants of a lifetime, while others for whom we predict immunity suffer from pericementitis, sometimes apparently without an exciting cause.

"State of the system" is, then, a factor in the production of pericementitis. The most resistant state will not, indeed, render the individual proof against or indifferent to a large dose of inflammation-producing poison; but there are marked differences between persons of different systemic types and states, both in resistance and in the nature of the effects produced. Our knowledge of systemic states or types is small or superficial, and our predictions based on this knowledge are consequently inadequate. But while our knowledge is small and its predictions are therefore limited and often erroneous, it is not without value as a basis for guarded conservative action.

Let me add here, like the corrigent in a prescription, the remark that in my belief common and purulent inflammation differ radically; that, interpreting them by the respective extreme cases of the effects of cantharides and croton oil on the skin, I hold that purulent inflammation is inflammation plus something else (the agent of which something else is a croton-oil-like substance, usually secreted or excreted by bacilli or cocci). To state the matter concretely and therefore plainly, I hold that quinsy is not to be likened to or interpreted by catarrhal inflammation, or by any of the ordinary forms of glandular inflammation—by any of the renal inflammations, for instance, except pyonephrosis. I admit that there is no clear clinical line dividing purulent from non-purulent inflammation—that an inflammation which if severe enough would be purulent is often non-purulent because of its mildness (which mildness is due either to the condition of the patient or the scantiness of the croton-oil-like poison), and that there may be mongrel inflammations, some form of the non-purulent being crossed with the purulent; but this admission has, it seems to me, as regards the radical diversity of inflammations, no weight—does not show that the two kinds of inflammation are not specifically distinct, any more than the fact that oxygen and hydrogen are often found in combination proves that oxygen and hydrogen are the same substance. In a word, I hold unqualifiedly that, while divers forms of non-purulent inflammation may shade into one another (may differ in degree rather than in kind), between them and purulent inflammation there is an impassable gulf; wherefore if I have in any part of the present paper so used the word inflammation as to indicate that I hold all inflammation to be akin, such use of the word has been inadvertent. Let me say further that, if I have so written as to indicate that the secondary hypothesis which I have adopted for the purpose of discussion expresses my entire or unqualified belief, my manner of expression has been unintentionally strong. I have stated two alternatives concerning the manner in which the condition-cause of the specified inflammation may be effective (namely, favoring the agent and favoring its action), and have perhaps, from desire to avoid complexity, spoken as if these alternatives were mutually exclusive. It is evident, however, that conditions of both kinds must play a part; and it is evident moreover that conditions favoring or resisting the entrance or presence of the agent are more important causally than those favoring or resisting its physiological action or effect. I do not say this as shrinking from the implications of the alternative here chosen for the purpose of discussion, especially its implication concerning the unfashionable doctrine of cumulation (for I hold that the extreme case, gout, places the doctrine of cumulation above the cavils of its fashionable rejectors). I say it because I believe it desirable, having conducted a discussion on what seemed to me the easiest line, to state plainly the fact that there is more beyond,—more things in purulent inflammation than have been considered in our scanty philosophy. Finally, let me say, as resolving a possible obscurity, that, while holding that common and purulent inflammation are essentially different, I hold that common inflammation predisposes to purulence. I have indicated a belief that state of the system causes tendency or resistance to purulent inflammation. How state of the system acts as a predisponent,—whether and to what extent by encouraging or antagonizing the vitality of microbes or by resisting or yielding to chemical poison,—I do not here inquire. I merely note the apparent fact or probability that purulent inflammation is not independent of the state of the system. And if, probably, systemic condition affects liability to purulent inflammation, then, not improbably, common inflammation may be a condition predisposing to purulence.

From what has just been said it follows that the present consideration does not pretend to be exhaustive—is avowedly only what the chemist would call a "proximate analysis." A complete consideration would necessarily carry its analysis further. It would examine separately, 1, the divers physiological effects of limited amounts of chemical agents; 2, The conditions of parasitico-microbic life, as affecting (*a*) the vitality of microbes, and (*b*) the character of the microbic excretion or poison. Such a consideration is certainly needed, but its place lies beyond the limits of this paper; for present purposes the proximate analysis is all that is either necessary or desirable. In a word, the analytical purpose of this paper is not to exhaust the subject, but to introduce it. The purpose is to intimate that critical study of extra-dental purulent diseases, such as quinsy (and tuberculosis), may prove of value to the dentist, not merely by presenting the agent of oral purulence, but also by showing the conditions, systemic and circumstantial, which, favoring the agent, give rise to purulent peridental inflammation.

So much for the view of the subject. My ultimate aim, I said in my opening statement of purpose, is treatment, especially prophylactic treatment. It is evident that the view here given, if accepted, either with or without amendment, will to some extent modify our prophylaxis—will extend its systemic element. If we believe that the character of apical inflammation is dependent on the state of the system, and if, furthermore, we hold that precipitation of inflammation may be due to a change in the state of the system, and might never occur if the system were always in proper condition, and if, again, we are assured that there is a systemic liability or resistance to this form of inflammatory disease, then the state of the system (whose amelioration, with regard to this disease, is at present little sought) will appear to us important; then it will appear to be our duty, in alliance with the general practitioner, to seek the systemic welfare of our patients, not solely with a view to the prevention or cure of caries, the development of fine dentures and the transmission of good dentures to offspring, but also with a view to prevention of the evils which center in the pulpless tooth, especially local purulent inflammation.

As regards remedial treatment, perhaps nothing should here be said. But I may digressively note that, if the belief as to the specifically distinct nature of purulent inflammation is well founded (and if there be any basis for another belief which I have not herein expressed—that, namely, the tubercle bacillus may yet be shown to be the agent of some cases of chronic peridental abscess or of some of those forms of alveolar abscess which are unaccompanied by marked inflammation), it will follow that our present local palliative measures are probably of small utility—that the true local means for the relief of purulent pericementitis, apart from removal of the agent of disease, are the placebo in mild cases, and in severe cases surgical interference. There is at the apex of the tooth-root the physiological equivalent of a drop of croton oil. The question of palliation is. Do we appreciably mitigate the local action of the internal croton oil by producing an inflammation or painting a sorbefacient on the surface of the gum? Perhaps we do; but the question is not beyond the region of debate. Clinical experience bearing on the subject is meager, but as far as it goes it sustains the inference. Counter-irritants, never conclusively shown to be beneficial in quinsy, mastitis, and kindred purulent inflammations, are gradually being abandoned as useless in some quasi-purulent inflammatory diseases, as tubercular meningitis. And, with regard to apical pericementitis, I, some years ago, when occupying an office alongside that of a gentleman who was medically less of a skeptic than myself, used for some months, in mild cases (apart from removal of cause, surgical measures, and antiseptics), no local treatment except a momentary application of colored water; my results being compared with and admitted to be equal to those of my professional brother who exhausted the resources of the pharmacopœia. Let me add, in order to render this last statement fit matter for criticism, that the general or systemic treatment of my professional brother and myself were substantially identical.

I said, in concluding my opening statement of purpose, that study of the tonsillar inflammation might, by confirming the general tenor of our belief concerning the etiology of the oral inflammation, lead to more successful prophylactic practice—more effective local prophylaxis. Admitting that, concerning ordinary apical pericementitis (as distinguished on the one hand from edematous pericementitis and on the other from what I may call localized or metastatic purulent inflammation), there is current an etiological belief whose general tenor is correct, it nevertheless seemed to me that all possible confirmation is desirable, because, apart from the intellectual satisfaction always afforded by confirmation, the firmer our assurance of any truth, the more positive will be our action. If we "think" that it will rain, we *may* take an umbrella; if we "know" that it will rain, we *will* take it.

And our action will be complete, as well as decided, in proportion as we feel assured. Belief will induce us to extirpate the dead tooth-pulp mechanically, as far as such extirpation is easy, and may lead to mild antiseptic treatment. Assurance will induce us to go further: it will lead to the thorough employment of antiseptics, and not only this, but also to a measure or series of measures at present generally neglected; namely, chemical cleansing of the pulp-chamber and canals and even the tubules of the dentine—the dissolving and washing out of the dead matter; for which solution, I may say in passing, the most generally useful materials will probably be, not pepsin and hydrochloric acid, but alkalies, borates, hypochlorites, permanganates, peroxides, and possibly, in some cases, the halogens. A still further measure may be induced by assurance; namely, the saturation of dead dentine or filling of tubules with some substance (*e.g.*, paraffine) insoluble in the vital fluids and liquefiable at a low temperature. But, whatever be the detail, our operative prophylaxis, when the belief which underlies it becomes firm conviction, will be both more decided and more complete; it will be more fully rational, and it will therefore be more successful.

THE ORIGIN AND EVOLUTION OF THE FACE.

BY ALTON H. THOMPSON, D.D.S., TOPEKA, KANSAS.

(Continued from page 175.)

It is not necessary at this late day, in the twilight of the nineteenth century, to defend evolution. To the truly scientific mind it has become a great working principle, like gravitation, and is no longer a theory or mere hypothesis that is open to doubt or amenable to criticism. It rests secure upon the very pedestal of nature itself. The book of nature is the record of evolution. Every animal and plant carries in its structure the history of the origin and development of its species. The growth of an individual is an epitome of the evolution of a species. The development of an organ is the history of the origin and evolution of a function, or, indeed, of its decay, as when an organ dwindles to a rudiment from disuse.

Birth, growth, origin, development, genesis, evolution, inception, unfolding, are inseparable from the life-history of every species, of every individual, of every organ, of every tissue, of every cell. As the individual has grown, so has the species. The principle of evolution applies to all and explains all. It is the working principle of biology, and to the scientific biologist requires no laudation nor explanation.

We therefore hasten to apply this principle in our study of the face in order to ascertain, if possible, and follow the path by which the features of the face in man have arrived at their present perfection and beauty. Having studied the face in its psychical aspects as the medium of expression of the emotions, we pass now to the study of its natural history,—*i.e.*, its relation to lower forms of animal life with which it is correlated,—and attempt to illustrate the form of the face by comparison with features in the lower animals with which it may be compared. We will study man as an animal, the face as an organ, and expression as a function.

Prof. Joseph Le Conte says ("Evolution and Religious Thought") that "Every individual animal body has become what it now is by a gradual process. Commencing as a microscopic spherule of living but apparently unorganized protoplasm, it gradually added cell to cell, tissue to tissue, organ to organ, and function to function; thus becoming more and more complex in the mutual action of its correlated parts, as it passed successively through the stages of germ, egg, embryo, and infant, to maturity. This ascending series of genetically connected stages is called the embryonic or octogenic series,—the genesis of the individual." Again he says, "Embryonic development is the type of evolution; and evolution is continuous progressive change, according to certain laws and by means of resident forces. . . . Commencing with the lowest, unicelled, microscopic organism, and passing up the animal scale, as it now exists, we find a series of forms similar to, though not identical with, the embryonic series. Here we again find cell added to cell, tissue to tissue, organ to organ, and function to function,—the animal body becoming more and more complex in structure, in the mutual action of its correlated parts and the mutual action with the environments, until we reach the highest complexity of structure and of internal and external relations only in the highest animals."

It is not yet possible to trace the descent of man back to the primeval protozoan, which was the origin of all life. His genealogy can only be approximated, and must forever remain a mystery. The process of the evolution of animal life does not form a continuous ladder from the lowest to the highest, for there are many breaks and missing links. The protozoan is the lowest sub-kingdom, the vertebrate is the highest, but the line of ascent from the one to the other is not homogeneous, nor continuous, nor symmetrical.

Man is a vertebrate animal, but the course of his descent, even after the differentiation of the mammalia from the vertebrate series, is very uncertain. He retains morphological affinities with so many and sometimes widely separate branches, that he is not related so very closely to any of them. He most resembles the anthropoid apes, of course, but it is by parallel—not direct—descent that he is related to them. He is not descended from them, but from a common ancestral form with them, which, in its turn, was descended from a common progenitor of other vertebrates. When the genealogy of man shall have been worked out as completely as that of the horse, for instance, we shall have a wonderful biological history, but for the present that history is incomplete. Darwin says ("Descent of Man"), "The most ancient progenitors in the kingdom of the vertebrata probably consisted of a group of marine animals resembling the larvæ of existing ascidians. These animals probably gave rise to a group of fishes as lowly organized as the lancelot, and from these the ganoids and others, like the lepidosiren, must have been developed. From such a fish would arise the amphibians,—the fish-like reptiles,—and from these the true reptiles and birds. These are closely connected with the Monotremata, which connect mammals and reptiles in a degree; but the line of descent of the higher vertebrate classes—mammals, birds, reptiles—from the lower classes—amphibians, fishes, etc.—is obscure. But from the Monotremata arose the Marsupials, which were the early progenitors of the placental mammals. We may thence ascend to the Lemuridæ, and thence the interval is not very wide to the Simiadæ. The Simiadæ then branched into two great stems,—the new-world and the old-world monkeys,—and from the latter at a remote period man proceeded." Not from the forms that now exist, however, but from a common progenitor with them. Our study of the face will, therefore, need to be comparative, perhaps more than genealogical, except in the few instances in which there is evident descent. There are gradation stages plainly evident as the facial parts arose from the lower headless forms of animals, which possessed neither face nor separate sense organs.

Of course the mere structure of the face arose from its parts having been evolved and erected for the accommodation of some of the special sense organs. In fact, we must place its origin at the time of the differentiation of the special senses, when special structures were demanded for their support and protection. We follow backward along the path of the evolution of the face, and find its origin in the differentiation of the four facial senses. But previous to this differentiation of sensation into the various special senses we observe that unspecialized nervous organization preceded function, unless, indeed, sensation exists without and preceded nervous organization. "It is well known that the protozoans—sponges, cœlenterates, infusoria, etc.—depend for sensation and motion upon the irritability and contractibility of protoplasm," says Mr. A. S. Packard ("Standard Natural History"). Again, "A genuine nervous organization for the first time appears in the jelly-fishes. The Echinoderms, star-fish, etc., have a mere nervous ring, but probably without ganglia; but in all other invertebrate animals, from the worms and mollusca to the crustaceans and insects, the nervous system consists generally of a pair of ganglia above the œsophagus called the brain, on the under side a second pair, and the four ganglia with the nerves and commissures connecting them is often called the œsophageal ring, from which slender threads reach away to the various parts of the body. In some forms the lower pair of ganglia are missing, and others have another pair, the visceral ganglia, added. In the higher worms, crustacea, and insects there is a chain of ganglia or brains which are ventral and line the floor of the body cavity. In the very highest invertebrates there is a mass of ganglia, as in the head of the cephalopods. In the vertebrates the brain is more simple, consisting of a series of close-set ganglia forming a mass situated in a bony case, the skull, with the spinal cord extending through the vertebra and having a definite relation to the sense organs, and sending branches to all parts of the body.

"The tactile sense, or sense of touch, is common to all animals. It is the fundamental sense, of which all others are but modifications. The most conspicuous sense organs are the eyes. A transparent spot on the front of some lower forms is probably the simplest of all sense organs, and anticipates the eye of higher animals. The simplest form of eyes are perhaps those of the sea anemone, in which there are, besides pigment-cells, refractive bodies, and from this true eyes develop as the scale of life advances. In some worms true eyes appear, —a projecting, spherical lens behind a vitreous body, retina, and optic nerve. In the crustaceans the eyes assume a quite definite place in the head, except in a few instances. In insects the eyes, both simple and compound, are located definitely on the head. In the skulled vertebrates the eyes are of definite number, and in all types occupy a definite position in the head.

"The simplest kind of auditory organ is found in the jelly-fishes, the first lower form in which it appears. The otocysts, or simple ears, of the worms and mollusks are minute and usually difficult to find, as is the auditory nerve leading to the nerve-centers. In the clams the ears are in the so-called foot; in the cuttle-fish and snails, in the head close to the brain; in the shrimps and crabs, at the base of the mandibles; in a few other crustaceans, at the base of the tail. In the insects there is a real tympanum cavity,—a sac with a ganglionic cell within, but the position is very variable. In the locusts the ears are at the base of the abdomen; in the katydids and crickets, in the fore tibia; in the butterflies, probably in the antennæ, etc. In the vertebrata the ears are two in number, and are definitely situated on the sides of the head. The sense of smell is obscurely indicated by special sense organs in the invertebrate animals, nasal organs, as such, being characteristic only of the skulled vertebrates. The organ of taste seems to be specially differentiated only in the vertebrates, so far as we can tell."

Our field is thus reduced to the vertebrates, for the sense organs are so scattered throughout the body in the invertebrates that there is really no such part as the face, in that class, as understood when speaking of the vertebrates. It is in this latter class only that this part becomes apparent as the seat of four of the special senses. How, then, does the face originate and develop in the vertebrata?

The embryology of the face is not difficult to follow. It is conceded that its main elements are formed from the remains of the gill arches of the fishes and early vertebrate amphibious forms. In the early embryonic condition of the higher vertebrates, including man himself, we find on each side of the neck several gill slits, each with its gill arch. Mr. R. R. Wright ("Standard Natural History") says, "In the aquatic vertebrates the anterior part of the alimentary canal communicates with the outside by a series of gill-clefts on either side, through which the water streams for respiratory purposes. Although these gill-clefts shortly disappear, with the exception of the first, in the air-breathing vertebrates, yet they are present in the embryos of all, even of the highest. Between the clefts (also known as the visceral clefts) are solid pillars, visceral folds, which are not developed in the higher forms, except in the first and second arches, the rest being suppressed or nearly so. An actual fusion takes place between the upper arch and the cranial skeleton to form the upper jaw, while the second arch is modified into the lower jaw, the Meckelian part, which is hinged to the upper jaw and suspended from it." From this origin the jaws are developed in all the higher forms, man included. In the human embryo the origin of the face and jaws is well indicated, the gill-clefts being quite conspicuous in the embryo face. Their failure to unite is the cause of that embryological deformity known as hare-lip.

Of the origin of the vertebrate mouth, Mr. Bettany writes (following Dr. Dohrn, "Nature") that "the vertebrate mouth is a modern structure, and arises extraordinarily late in development. The embryonic body is almost completely formed, all the great systems are established, while as yet there is no mouth. It does not arise either in the position in which it permanently remains in the majority of vertebrates, but undergoes considerable shifting. Only in some fishes does it retain its primitive situation. The study of its development establishes the idea that the mouth of vertebrates is homologous with the gill-clefts.''

In the vertebrates (Mr. Wright, *op. cit.*) ''all the higher sense organs may be regarded as differentiated parts of the skin, the nerves of which have become greatly specialized, and have thus acquired a more marked individuality than the other sensory nerves. . . . Regarding the auditory organs, in the fishes only the internal ear is present, without the additional drum-cavity and external ear which we find in the higher forms. In the sharks the auditory labyrinth is surrounded by cartilage, but in most fishes it is free. . . . The higher vertebrates carry out the plan begun in the sharks, the labyrinth being completely protected by an osseous capsule.'' Audition is assisted in some of the higher forms by the erection of a sort of sounding-board from the integument,—the external ear. This becomes a very expressive feature in some forms, as in Equus.

''The eye is rather more elaborated regarding its internal structure in the higher vertebrates,'' and its position in the face is such as to make it a very important adjunct in expression. It is considered to convey as much expression as the facial features, and becomes expressive at an earlier stage in the evolution of the face. That is, animals which have little or no facial expression, whose features are undeveloped and immobile, have eyes which are very expressive and indicate the feelings and passions with no uncertain signs. Its supporting structures have little influence in modifying the features, as they are not extensive in the class.

The olfactory sense organ is more important, regarding the influence it has in modifying the facial contour of animals. The structures erected for its accommodation present great variety and are often very extensive. The organ of smell ''first appears as an involution of the skin in the lowest forms, and in Amphyoxus is represented by a ciliated sac near the anterior opening of the neural canal,'' and retains this relative position in all vertebrates. ''In fishes the forms of this organ are very various, but in the sharks a groove leads to the roof of the mouth, which is afterward changed into a canal in other, higher forms.'' From this beginning the organ is developed in various forms, and in some animals, as the ruminants, an extremely extensive structure is erected, with long and high nasal bones and large turbinated bones, for its accommodation.

How much the sense of taste has had to do with the development of the tongue, and consequent effect upon the oral structures, we can form no estimate, for these structures seem to be erected mainly for the accommodation of the dental armature. The jaws vary as the food habits cause the teeth to vary, or as the teeth may be developed for other purposes. As these are modified to adapt them to the food habits, the jaws are formed to support the teeth, as, for instance, in the carnivora or the ruminants. The mouth is developed from a mere orifice for the reception of food for its introduction into the alimentary canal, to the position of an important facial feature. In the higher forms the lips advance from mere prehensile organs to becoming conspicuous features in facial expression, for in man the mouth is the most expressive of the mobile features.

(To be continued.)

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PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting in the parlor of the American Society of Mechanical Engineers, No. 12 West Thirty-first street, New York, on Tuesday evening, June 10, 1890.

The president, Dr. J. F. P. Hodson, in the chair.

Dr. Sherman B. Price, of the Clinic Committee, read the following

CLINIC REPORT.

A stated clinic of the society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street. . . . Dr. George Evans, of New York, demonstrated his method of crown-work by preparing the root of a left superior first bicuspid and adjusting the crown, the operation not being completed owing to the condition of the root. He also exhibited his set of root-trimmers. One style is made in the form of a bur with screw-curved serrations, to be used in an ordinary hand-piece or right-angle attachment on the dental engine ; the other style is of a pyramidal form, each edge of which can be used singly and alternately as a scraper in a hand-socket. As Dr. Evans read a paper before this society October 8, 1889, a report of which will be found complete in the DENTAL COSMOS, vol. xxxi, page 944, it is unnecessary to enter into further details. . . . Dr. W. S. Elliott, of Hartford, Conn., presented two models, representing the mouth of a patient thirty years of age, showing excessive protrusion of superior maxilla in model No. 1, and successful correction of defect in No. 2, where an ordinary rubber plate was inserted and mounted with White's sectional teeth. As will be seen, mastication was very imperfect before operation. Dr. Elliott states that it is now very satisfactory. It will be noticed that on the palatal aspect of No. 2 the plate is fenestered to favor cleansing and also to avoid undue clumsiness. The space in the lower maxilla was subsequently supplied with a partial denture. Dr. Elliott states that the operation greatly improved the profile of the patient. . . . Dr. A. R. Starr, of New York, exhibited his new form of splint for holding loose or implanted teeth. A gold plate is swaged to fit the cutting-edge and posterior of teeth affected and the one in normal condition on each side, with little platinum and gold wings passing between and burnished around the necks of the teeth and fastened in position with oxyphosphate. The plate is made of twenty-two-carat gold, No. 30 gauge. It is a very simple and practicable appliance, and one that would not injure the teeth. . . . Dr. G. W. Blakeslee, of New York, presented the following case for consultation : Miss G., thirteen years of age, showing both superior central incisors with dentine almost wholly removed by decay to a point midway between the cutting-edges and cervical margin. The line of demarcation between the sound portion and area of decay is transverse and very distinct, evidently the result of malnutrition at the period of calcification of the lower portion of the crowns. All of the lower incisors are pitted and partially denuded of enamel ; also the cuspids of each jaw. The superior laterals and bicuspids are sound and well developed. Neither of the second inferior bicuspids or four twelfth-year molars have erupted, and the four sixth-year molars are decayed in the same manner as the incisors. The advice given by several gentlemen present was to save the incisors as long as possible, as presumably later on their condition would necessitate crowning, the extraction of the superior molars and the capping of the lower molars, thus preserving the normal shape of the lower maxilla. . . . Dr. Rider, of New York, also presented a case of pyorrhea alveolaris,—the patient a gentleman about thirty years of age ; the tooth a left superior central incisor. The patient had been under the care of another dentist who had been trying to regulate the left central incisor, between which and its fellow was a considerable space and a tendency to close back of the lower teeth. As the case was reported, a rubber band had been used to force the tooth forward and nearer to its fellow central, which had caused the tooth to loosen and discolor and an excessive discharge of pus. After removing the calcareous deposit upon the root and subsequent treatment, the tooth was found to be firmer and with little discharge. The opinion was that the pulp was still living, and that with care and proper treatment it could be retained. In such case the "splint" exhibited by Dr. Starr would work nicely. . . . Dr. J. A. Kimball again presented a case of pronounced protrusion of the lower maxilla of a gentleman about fifty years of age, showing the completion of the case. His method had been to expand the upper arch by means of wedges and plates, and to contract the lower arch, the lower teeth now forming almost a double row in front. The fixture on the lower consists of a gold crown and bridge, holding the teeth in position and furnishing occlusion to five or six upper teeth. Dr. Kimball also presented a piece of wedging rubber, which, owing to its flanged edges, he claims will not work up or irritate the gums. . . . Dr. R. O. Stebbins, of New York, presented a portable stand for a dental lathe-head. Any lathe-head can be adjusted to it, and the running power obtained by detaching the uprights of a dental engine, the stand then being placed over the running-gear and the belt being attached to the lathe. The standard is made of round wooden rods, jointed together like a fishing-rod, and can be adjusted to the height of a person using it. Its appearance is more easily explained by saying that it resembles greatly the Eiffel tower.

Dr. W. Carr. Mr. President, I have here a model of the mouth of a gentleman aged thirty-five, who has for over two years been suffering from an offensive odor and purulent discharge from the right nares, accompanied by almost continuous pain in the region of the frontal and ethmoidal sinuses. He has been treated by several physicians for chronic rhinitis. Last Friday he consulted me, when I found that he was wearing a full upper denture, and that the root of the third molar and the palatal and buccal roots of the second molar had not been extracted. There was necrosis of the bone from the canine fossa to the tuberosity. My diagnosis was suppuration of the antrum resulting from necrosis. I removed the roots of the second and third molars and then made an opening into the antrum. Upon syringing, a copious flow of pus followed through the osteum maxilla. I have since cleansed the antrum daily, and yesterday removed the entire buccal plate of the alveolar process.

I think that this case forcibly illustrates the necessity of removing all roots in the posterior portion of the mouth when an artificial denture is to be worn.

Dr. E. Parmly Brown. Mr. President, I would like to mention two little things which I think are of interest. Our profession is made up of little things. Lately I found the problem of obtunding sensitive dentine was still an open question. I found also that the question of thermal changes and the shocks which are sent into the living pulp—into the life of the tooth after metallic fillings are inserted—has been something of an annoyance and distress in some cases ; and we have heard of fillings causing the death of pulps which we had tried to save. We are called on nowadays to build up portions of teeth with gold,—for instance in making contour operations and knuckling operations upon bicuspids, which is a most skillful work,—and the bicuspids are the teeth which the great mass of our profession have failed to save. I have experimented for years with oxyphosphate and oxychloride fillings ; I have made hundreds of experiments which I have not mentioned. Lately I have been making some experiments in incorporating a very fine-grained asbestos in oxyphosphate fillings in the proportion of about one-third of asbestos to two-thirds of phosphate. Oxychloride I have abandoned as being too much of an escharotic to place near tooth-pulps. Even the oxyphosphate, which does not irritate, permits thermal changes and shocks, lasting perhaps a week or a month in some cases. I am incorporating asbestos, which we will assume to be a better non-conductor than the oxyphosphate itself. I have done that in some desperate cases in which I expected serious trouble from the solid gold operations near the pulp, and yet in not a single instance have the patients complained of any thermal changes. I have had success with it as a nerve-capper. A non-conducting filling is what we want. It occurred to me that perhaps a diametrically opposite method from that which was pursued thirty years ago might be successful. We then used fine ground quartz or silex in oxychloride fillings, thinking it would prevent wear ; but we found that when a piece of silex would get loose it would plow its way across the filling and assist in breaking it down instead of preventing it from wearing away. Asbestos is exactly the opposite of silex ; instead of fragments of glass, it is silken thread ; it will allow the masticating motion of the teeth without abrasion and prevent wearing. I am now experimenting, and will report the results later, in regard to the wearing qualities of asbestos in oxyphosphate fillings. I have been using asbestos in this way for a year or two, but only in the last year have I made a practice of it so as to feel able to report on it. The process of setting is somewhat hastened by the incorporation of asbestos, which is due, I think, to its absorbing some of the moisture.

Another interesting feature was suggested by Dr. Palmer, of New Jersey. He was making some porcelain bridges for anchoring on roots, and he found difficulty in taking an impression of the end of the roots. You all know that when the root is dressed down in crown-setting the gum is apt to come over the end of it. In putting the wooden peg in the canal for the purpose of getting its direction it occurred to Dr. Palmer to pack gutta-percha around it, forming an exact impression around the pin and end of the root ; and when he took the impression the pegs and gutta-percha came out as part of it. Whether that is new or not I do not know.

Dr. Carr. Mr. President, the secretary has announced that I am to read a paper this evening. I did not promise to read a paper, but to fill up the time in talking on dental law.

Probably you are not all aware that since the committee reported a year ago there has been an amendment of the law of 1888. When we commenced to enforce the law of 1888 we found that it contained a number of weak points. Some of these were called to our notice by our attorney, and others by the attorneys for the defendants. So the committee was obliged to apply to the legislature for further amendments to cover these defects. The first weak point in the law of 1888 was discovered when one White presented to me, as censor for this district, a certificate from his father, stating that he (the son) was in active practice prior to June 20, 1879, and asked for a certificate of registration. I refused to give him a certificate on the ground that he was not of legal age at the passage of the law of 1879, and was therefore not entitled to register. The committee's interpretation of the word ''person'' in the phrase, ''any person practicing dentistry,'' was that it was intended to apply only to one of legal age, —twenty-one years. White's attorney claimed that the law could not be thus construed, and served the censor with a mandamus returnable before Judge Patterson in the Supreme Court to show cause why said White should not be registered. Upon hearing the arguments in the case, Judge Patterson refused to grant a mandamus. White then asked for a trial of the issue, which was granted. The case was tried in July before Judge Ingraham, of the Supreme Court. Meanwhile the present law had been passed, and Judge Ingraham's decision covered the following points : That a person practicing dentistry must be twenty-one years of age, and he must be a graduate of a dental or a medical college recognized by the State Dental Society, or must have received a diploma from the State Dental Society, or must have been registered under the law of 1879.

The next weak point noticed was the term ''a reputable dental or medical college.'' The question arose, ''What constitutes a reputable dental or medical college?'' In order to avoid any possible difficulty in future, the word reputable was dropped, and the law reads as follows : that the college ''must provide a proper and sufficient course in dentistry or medicine.''

Again, there was no penalty provided for false registration or for presenting false diplomas. Even yesterday our detective found a man trying to purchase a diploma, and who had made a standing offer of five hundred dollars to secure one. Before the passage of the present law it would have been an easy matter for this man to register, had he succeeded in purchasing a diploma, as he would only have been required to swear that the diploma that he offered was *his*. This cannot be done at present, unless the man is guilty of perjury and is subject to its penalty. Heretofore it was not perjury, even if he had sworn to it. The defects in the old law have thus been rectified, and the law has been sustained by the Supreme Court.

A copy of this law should be in the hands of every person practicing dentistry in the State of New York.

Dr. Carr then read the dental law, as follows:

An act to amend chapter five hundred and forty of the laws of one thousand eight hundred and seventy-nine, entitled "An act to regulate the practice of dentistry in the State of New York," as amended by chapter two hundred and eighty of the laws of one thousand eight hundred and eighty-eight.

Approved by the governor May 31, 1889. Passed, three-fifths being present.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Chapter five hundred and forty of the laws of one thousand eight hundred and seventy-nine, entitled "An act to regulate the practice of dentistry in the State of New York," as amended by chapter two hundred and eighty of the laws of one thousand eight hundred and eighty-eight, is hereby amended so as to read as follows:

SEC. 1. No person shall practice dentistry or assist in the practice of dentistry either as agent or employee in the State of New York who shall not have received a proper diploma from the State Dental Society or from the faculty of a dental or medical college recognized and approved by said society as providing a proper and sufficient medical or dental education and maintaining a proper standard thereof, and no person shall practice dentistry in this State who shall not have attained the full age of twenty-one years and registered in the office of the clerk of the proper county, as provided in section three of this act; provided, however, that any person who, after attaining the age of twenty-one years, practiced dentistry in this State for ten consecutive years prior to the twentieth day of June, one thousand eight hundred and seventy-nine, may, within three months from the passage of this act, upon making affidavit to that effect before the clerk of the county in which he shall engage in such practice, register and practice as a dentist without having received a diploma from the State Dental Society as required in other cases. Provided, further, that nothing in this act contained shall prevent a student who is pursuing a regular course of instruction from assisting a person duly qualified to practice dentistry and registered as herein provided.

SEC. 2. Any person who shall practice dentistry in this State without the authority prescribed by section one, and without having duly registered as required by section three of this act, shall be deemed guilty of a misdemeanor, and shall be punished on conviction of a first offence by a fine of not less than fifty dollars, and on conviction of a second offence by a fine of not less than one hundred dollars. All such fines shall be paid into the treasury of the county wherein they shall be imposed and applied to the benefit of the common schools of that county.

SEC. 3. No person shall practice dentistry in this State who shall not have attained the full age of twenty-one years. Every person practicing dentistry within this State who shall not have made prior to the passage of this act such registration as was required of dentists by the laws in force prior to this enactment, and at the date of such registration shall register in the office of the clerk of the county where his place of business is located and in the office of the clerk of any county into which he shall remove or in which he shall carry on his business, in a book to be prepared and kept by the clerk for that purpose, his name, age, office, and post-office address, legal authority for practicing dentistry in this State and the date of such registration, which he shall be entitled to make only upon presenting to the county clerk a certificate from the member of the State board of censors appointed by the State dental society for the judicial district in which said county is situated, to the effect that said applicant for registration has received a proper diploma as provided in section one of this act, and upon the making by said applicant of an affidavit stating his name, age, and legal authority to practice dentistry within this State. Every person admitted to registration under the provisions of this act shall be entitled upon the payment of a fee of fifty cents to receive from the county clerk a certified transcript of his registration. All affidavits made in pursuance of the provisions of this section shall be preserved in a bound volume by the county clerk in whose office they are made, and all affidavits made pursuant to the provisions of section one of this act shall be filed in such office, and if any affidavit made pursuant to the provisions of this act be false in any material regard, the affiant shall be deemed guilty of perjury and punishable therefor as prescribed by the penal code. It is further provided that any registration procured by fraud or false statement of any kind shall be deemed null and void, and the person procuring the same shall be guilty of a misdemeanor and punishable on conviction by a fine of not less than fifty dollars, or by imprisonment, or by both fine and imprisonment.

SEC. 4. This act shall constitute the only penal statute regulating the practice of dentistry in this State, and all acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SEC. 5. This act shall take effect immediately.

Dr. Carr. There is but one amendment to the present dental law that I would suggest,—namely, that the fines collected should be turned into the treasury of the district society in which the conviction is obtained. An effort will probably be made to have this done at the next session of the legislature. There have been in this city and in Brooklyn twenty-two convictions and fines, and these fines, if turned into the treasuries of the societies, would have materially increased the fund necessary to meet the expenses of enforcing the law.

Dr. Brown. There are some interesting features about that law that I should like to inquire into. For instance, in regard to a student not being permitted to act as a student, and practice under the supervision of his preceptor. I understood that the law of 1888 had been gotten over, and that when a man was away from his office a student could practice. A man might go away and stay six months and his student practice in his absence. A certain student put arsenic in a tooth and the lady suffered three days, and he charged her a quarter for it, while his preceptor was in Florida. He was only a student, but he had entered one of the colleges, I believe. In the Southern States dentists travel through the country during the summer and practice. Now, it is not a free country if I cannot do in the State of New Jersey or anywhere else whatever I can do in the State of New York. Our Constitution does not permit such a demarcation between one State of this Union and another as requiring a dentist going from one State to another to pass an examination again. If I cannot go into any county in this State and practice, then there is a screw loose somewhere. The law read by Dr. Carr requires me to register in each county I practice in. That I think is childish.

Dr. Carr. Each State has a right to make its own laws; but I doubt very much whether any State board of examiners can demand the examination of a graduate of a college that is recognized as a reputable institution and that can prove that it furnishes proper education for the profession. That point will soon be determined by trial in a sister State, and I believe that the examining board will be beaten.

Dr. Littig. It is so now in New Hampshire.

Dr. Carr. Yes; a man may go from Harvard University, or Ann Arbor, or any college that has a good standing, and go to New Jersey or Massachusetts and practice, and I think you will find that if he takes the case to the Supreme Court of the United States he will get judgment in his favor.

Dr. Brown. I am very much interested in this. I am making it an international question now. There has been a correspondence going on between the state department of this country and the state department of Great Britain for over two years. I am satisfied that the English law is internationally unconstitutional. They cannot say over there that you cannot practice in England if you have proper certificates of qualification; I am satisfied that such a law will not stand when brought to the test. If our state department brings the matter up as I expect, they will say to England, Gentlemen, you cannot make fish of one and flesh of another; there is no such difference.

Dr. Carr. Very frequently a foreigner applies to us for registration. The State of New York does not recognize any foreign diploma. The holder of such a diploma must pass the State board of examiners before he can be admitted to practice in this State. Scarcely a week passes without an application for registration from some one who has "a license to cup and leech and to extract teeth." These applicants are principally Germans and Italians. Certainly a license to extract teeth cannot be taken as a certificate of qualification to practice dentistry.

Dr. Brown. We do not make fish of one and flesh of another?

Dr. Carr. No; that is where the New Hampshire law fails.

The President. Dr. Carr, do not the laws of foreign countries recognize only some medical colleges here and not others?

Dr. Carr. Yes; when we hear of certain medical colleges being recognized abroad, it means that under certain conditions the *time* is recognized that has actually been spent in study. In this country a course of three years' study is required to obtain the degree of M.D., while in Europe I believe that a course of seven years' study is obligatory. If a person holding the American degree of M.D. also holds the degree of A.M., A.B., Ph.D., or any other degree conferred by our universities, he would be credited in Europe with three years of study, and with an additional course of study for four years he would then be entitled to examination for graduation. This is what is known as a recognition of American diplomas.

Dr. Walker. Mr. President, I do not think the dental law can be too rigid in any State at the present time. It is the dental laws throughout the United States that are placing dentistry on a higher plane every day; but I think the dental laws of New Jersey and of Massachusetts are in direct opposition to the National Board of Dental Faculties. The Board of Dental Faculties meets every year at the same place and time as the American Dental Association, and it is that board which governs the different dental colleges throughout the country. Having a board of that description where all the reputable dental colleges are represented, I should think that would be sufficient; and I am of the opinion that in time it will rest with the Board of Dental Faculties to decide who shall and who shall not practice dentistry in the United States. In this I agree with Dr. Carr. New Jersey recently passed a law which prevents us from going there to practice, except to extract teeth; we would have to pass its board of examiners before we could practice in New Jersey. I think that the laws of all the States which require dentists to pass the State examining boards or boards of censors will eventually be annulled, and that the Board of Dental Faculties will govern the dental profession throughout the United States.

Dr. Carr. There is an effort now being made to frame a uniform dental law to be presented to each State legislature, providing that a person who is qualified to practice dentistry in one State may, if he chooses, practice in any other State without further examinations.

Adjourned to meet the second Tuesday in October.

B. C. Nash, D.D.S., *Secretary.*

AMERICAN MEDICAL ASSOCIATION—SECTION OF ORAL AND DENTAL SURGERY.

(Continued from page 578.)

Dr. Marcy reported the following case for advice. The patient was about sixty years of age, general health good. About the 1st of January he had the grip. Afterward he complained of pain at the root of the right lower wisdom-tooth, which had been filled a number of years previous. He sent him to a good dentist, who thought best to remove the tooth; he did so, and found at the root a pus-pocket. Within a few days the inflammation had run all around the teeth of the lower jaw, seeming to confine itself to the alveolar process. After some consideration every tooth was removed and effort was made by injections, etc., to clear out all disease of the parts, but within six weeks he had several abscesses and pus-cavities which still remain intractable.

Dr. W. H. Morgan asked if there was any necrosed bone.

Dr. Marcy said he could not be sure, but he had removed all that could be found.

Dr. Morgan said he thought more would be found, and the only way would be to cut down to the bone, clear it thoroughly, and then clean it out with full strength of carbolic acid,—that is, carbolic acid with just enough water added to make it liquid. This will make the parts aseptic and cause healthy granulation.

Dr. Crawford said that the best method is to use a large scoop instead of a bur to remove the necrosed bone and freshen it up, then wash out with bichloride of mercury 1 to 5000, wipe out with camphophénique, and then fill the wound with iodoform gauze.

Dr. Talbot preferred the peroxide of hydrogen; thought it best for cases especially of the lower jaw.

Dr. Marcy thought the patient would object to the use of peroxide of hydrogen, as it had been used before on him with very unpleasant results.

SECOND DAY.

The section met at 3 P.M. Dr. Williams in the chair.

The following were elected officers for the ensuing year: Dr. Eugene S. Talbot, of Chicago, chairman; Dr. H. W. Morgan, of Nashville, secretary.

Dr. L. D. McIntosh, of Chicago, read a paper, illustrated by a projecting lantern, on

THE VALUE OF ILLUSTRATION IN THE LECTURE-ROOM,

of which the following is an abstract:

Dr. McIntosh said that the object of the paper was to demonstrate to those interested in the work of the lecture-room one of the best methods of illustrating the various branches taught. He believed that teachers in all departments of study recognize the necessity of illustrations. Abstract teaching alone fails to produce so permanent an impression as it does when associated with illustrations. The public lecturer makes his lecture attractive and instructive by using views to illustrate the scenes he describes.

If we should, when lecturing before classes, cut short the description and project on the screen before them whatever it is we wish to give them an accurate conception of, let it be an apparatus, an instrument, or a physiological or pathological condition, the students would have impressed upon them in the clearest manner an exact idea of the subject. Words are misunderstood, but the language of graphic illustration is clearly understood by anyone.

Dr. McIntosh believes there is no way of illustration that is as easy, as clear, and as cheap as by the use of projection. We have at our command very perfect apparatus for this work, and can show diagrams, photo-micrographs, micro-photographs, microscopic specimens, opaque objects, chemical reactions, crystallization, polarization, etc., to large classes as easily as to one person.

To make the point clear, suppose our subject for to-day to be the circulation of the blood. We would thus exhibit to the class a diagrammatic representation of the systemic circulation, show its course through the vena cava into the right auricle, to the right ventricle, through the primary artery to the lungs, through the capillary network surrounding the air-cells, back through the pulmonary vein to the left auricle, into the left ventricle, into the aorta, and on through its round of circulation. Let us now project a microscopic section of a lung. Here we see the ultimate capillary net-work surrounding the air-cells, connective tissue, etc. With other specimens we could show the epithelial lining, in fact follow out all the detail and minutiæ on the screen as perfectly as though we had our specimen on the stage of the microscope ; and we have the advantage that we can describe it to all the class as easily as to one member, and can point out the various structures.

Take another example, a diagram of a tooth showing the enamel, dentine, etc., and follow with a microscopic section. This we can see almost as plainly as a diagram. With these illustrations the way is paved for intelligent work with the microscope in the laboratory. When the student mounts a tooth-section and places it under the microscope, he sees a familiar object, just what he has seen by aid of projection and heard described, even to the color and delicate tints of shade. Had the lecturer's illustrations been made on a blackboard, the student would not have recognized the actual specimen under the microscope.

Dr. McIntosh had by this means shown before a class the circulation of the blood in the foot of a frog. The capillaries were shown from one-half to two-thirds of an inch in diameter. The red blood-corpuscles could be plainly seen coursing along through them, and now and then a white one cutting across lots. When the web of the foot was pricked with a needle, the vessels congested around the wound, and the wounded end of one capillary projected into the opening (which appeared about three inches in diameter). The blood-corpuscles were ejected in a stream with each impulse of the heart. The circulation became slower and slower until the congestion was complete; the foot was released, rubbed to establish the circulation, and after a short time placed again under the field of the microscope. The circulation was now seen over the entire field, except in the wounded part.

In one short hour the class had seen the circulation in the capillaries, the migration of white corpuscles, congestion, a bleeding capillary (showing that the impulse of the heart extends through these fine vessels), and the establishing of circulation by massage after it had ceased. Could any description have given as vivid an impression on these students as did the illustration?

This method of projection is not confined to transparent objects. Opaque objects as well can be magnified and projected on a screen. We will place a tooth on the stage, and by the aid of reflection project a clearly-defined image on the screen. [Dr. McIntosh here showed a section of a tooth which had contained a gold filling. It appeared on the screen about a foot and a half long, and was a beautiful example of the value of the work, showing the different structures of enamel, dentine, the pulp-chamber, canal, and periosteum; also the under-cut made to retain the filling. This illustration called forth a burst of applause from the section. Afterward were shown various objects, such as a plugger-point magnified to about two inches in diameter, and showing the serrations, etc., very plainly.]

In this manner can be shown magnified any small opaque object. Malformations of teeth and roots, pulp-nodules, fissures, etc., can be shown by making transverse and longitudinal sections; any small instrument or mechanical device may also be shown in this way.

Concluding, Dr. McIntosh said that he hoped the time was not far distant when typical objects properly arranged in sets, both microscopic and photographic, could be as easily obtained as text-books on the various scientific subjects. The teacher will then have his notes before him in the illustrations, he can abridge his lectures, and the poor student will not feel that he is being talked to death.

Dr. G. Frank Lydston read a paper on

THE RELATION OF TROPHO-NEUROSIS TO DISEASES OF THE MOUTH AND JAWS, WITH SPECIAL REFERENCE TO SYPHILITIC NECROSIS.

Dr. Lydston said that at the meeting of the Southern Surgical and Gynecological Association, held in Nashville in November, 1889, he had the pleasure of presenting certain views regarding the relation of tropho-neurosis to the phenomena of syphilis. In that essay he endeavored to show the dependence of every phenomenon characteristic of syphilis upon certain more or less obscure changes in the sympathetic nervous system (organic or functional, temporary or permanent) which resulted in aberrations of its trophic function. The more thoroughly he studied the phenomena of syphilis, the more firmly convinced he became not only of the dependence of syphilitic phenomena, but that of many other morbid changes which have hitherto appeared inexplicable, upon tropho-neurosis. He claimed that disease affecting the animal body can be produced only by one of two things,—first, perversion in the quality or quantity of that nutritive material which constitutes the pabulum upon which the various structures of the body feed; second, some perversion of that nervous energy upon which the building up of the tissues depends. The sympathetic system acts as a governor for the process of tissue-building; through the medium of its trophic fibers it presides over the functions of nutrition, of waste and repair. Incidental to repair there is a reproduction of cell-growth through the medium of the leucocytes. If the integrity of the sympathetic ganglia or of the afferent nerves be impaired, the young cells in the process of growth fail to become perfectly differentiated; as a consequence they retain the physical characteristics of "young" or "embryonal" cells. Not only do such cells fail to be transformed into vigorous tissue-structure, but they manifest the usual tendency of embryonal cells to abrupt proliferation and speedy degeneration.

In section of the syphilides, wherever found, they are composed of cells in nowise different from young connective-tissue cells. Fessenden Otis lays much stress upon this point. There seems to be but little difference between the syphilized cell and that progenitor of all connective-tissue cells,—the leucocyte. An increased rapidity of proliferation, perhaps a trifling increase of size over the average, and the power of infecting healthy tissue are the only new properties which the cell acquires by virtue of its syphilization. With the exception of the property of infectiousness, these qualities are possessed by all imperfectly differentiated cells. A young connective-tissue cell and a syphilitic cell under the microscope appear identical.

The morbid propensities of the embryonal cells are well shown in cancer, in which disease, according to Cohnheim, they are the foundation of the morbid process. Dr. Lydston argued that malignant growths are explicable upon the same grounds as syphilitic neoplasia. This explains why an injury of the tissues in one individual is followed by cancer, while in others normal repair occurs. In the former the functions of the sympathetic are impaired, and instead of a normal differentiation and building up of the cells, there occurs a heaping up of embryonal cells. There is practically no difference between such embryonal cells and those which, according to Cohnheim, remain imprisoned in the fœtal structure and under proper stimulus develop into cancer in after-life. This development of imprisoned embryonal cells a celebrated pathologist believes to be the *fons origo et mali* of cancer.

In considering abnormal tissue-growth, the medium through which normal tissue-growth occurs must be kept in mind. If the view that normal tissue-repair depends for its performance upon the integrity and function of the sympathetic nervous system be accepted, then, *nolens volens*, it must be admitted that any pathological process in which a heaping up of tissue, degraded or otherwise, occurs is produced through the medium of some aberration of the trophic function of the sympathetic. This Dr. Lydston thought was indisputable, and is the basis of his theory of the tropho-neurotic character of the phenomena of syphilis. There are numerous trophic disorders which are pertinent to the question of the dependence of the lesions of syphilis on a sympathetic neurosis; for example, bed-sores, perforating ulcers incidental to paralysis, certain abscesses, changes in the bones and joints in spinal arthropathy, or Charcot's joint-disease and gangrena vasomotoria. Raynaud's disease, or symmetrical gangrene, is attended by gangrene of localized areas of the skin and certain portions of the extremities which are unquestionably due to nervous disturbance. This disease was long confounded with erysipelas; its phenomena are those of ischæmia of tissue, followed by erythema, cyanosis, and gangrene. He had noticed in syphilis in certain instances a marked tendency to fluctuation of vaso-motor impulse; had observed a number of cases in which there was a marked tendency to epistaxis, hemoptysis, hemorrhage from the bowels and kidney, and in several cases complicated by stricture a tendency to hemorrhage from the urethra.

Certain diseases of the skin have been described quite appropriately as dermato-neuroses. Leloir states that certain lesions of the skin are a premonition of threatening neurotic trouble of a serious character. For example, one of his patients suffered with a severe herpes zoster of the right side of the chest for a short time, having been previously healthy. Six months later, paraplegia and paralysis of the sphincters occurred as a consequence of syphilitic myelitis. In a second case he observed the existence of a patch of non-parasitic alopecia areata for a short time previous to the development of the cerebral lesion of syphilis. The same lesion in another case apparently heralded the development of cerebro-spinal syphilis and general paralysis. In still another case labial herpes and scleroderma in circumscribed patches occurred from time to time for several years, and were followed by general paralysis.

Duploy records one case in which herpes of the inferior extremity led to the discovery of Pott's disease of the spine. In another case recorded by the same observer, œdema of the lower limbs with pigmentation of the skin led to a diagnosis of spinal meningitis.

Raymond cites a case in which intense herpes of the pharynx preceded cerebral symptoms. Eczema and neuralgia oftentimes precede chorea. He had called especial attention to the association of alopecia areata and herpes zoster with neurotic disturbances, and Prof. Ohmann-Dumesnil, of St. Louis, has reported several cases of alopecia due to traumatism.

His attention was first called to the possible dependence of syphilitic lesions upon tropho-neurosis by a series of cases of necrosis of the maxilla, alveolar processes, and palate and bones of the nose occurring in cases of tertiary syphilis. In studying these cases he was led to pursue the line of thought a little further, and found that evidences of the dependence of syphilitic phenomena upon organic or functional disturbance of the sympathetic system are quite positively manifested here and there along the whole line of morbid phenomena developed in the course of the disease. He thought there was not a lesion of syphilis which could not be explained upon this theory. Even the affinity of syphilis for the lymphatic glands appears to be analogous to those phenomena which occur in Hodgkin's disease and leucocythemia,—diseases which are inexplicable save upon the neurotic theory. In the late or sequelar syphilides there is a special tendency to disturbances of a tropho-neurotic character. It would appear that syphilitic infection has a peculiar affinity for the sympathetic nervous system, but that this affinity is particularly marked in the upper or cervical portion of the sympathetic. All through the disease the proportion of lesions about the head, face, and mouth is relatively much larger even under the best treatment than in other portions of the body. The parts supplied by the fifth cranial nerve appear to be particularly susceptible. Few cases indeed, no matter how thoroughly they may be treated, that are not affected at one time or another with lesions of lips, inner surfaces of the cheeks, tongue, throat, and scalp. Cases are frequently met with in which the initiatory and active periods of the disease have been passed through without serious trouble, when suddenly and without warning serious destruction of the nasal, palatal, or maxillary bones occurs.

Dr. Lydston said he had been much impressed by the peculiar course of some of the lesions of late syphilis, particularly those affecting the head, face, and oral cavity. The destructive effects exerted by the morbid process upon the bony tissue seem greatly disproportionate to the objective and subjective phenomena which precede the actual destruction. For example, the objective morbid phenomena of necrosis *en masse* of various parts of the palate, superior maxillary, and nasal bones are comparatively slight when we take into consideration the fact that the affected bone is entirely destroyed. Indeed, it often seems that the first objective phenomena perceptible in necrosis of the parts mentioned are not only destruction of the bone *per se*, but an attempt on the part of nature to rid the tissues of offending foreign material. Thus he had observed cases in which the greater portion of the palate was entirely destroyed, with but little manifestation of trouble apparent until suppuration occurred, with a small point of ulceration of the soft parts covering the bone and the discharge of a small quantity of pus,—a quantity, by the way, so small as to be entirely disproportionate to the extent of the morbid process. In passing a probe into the small sinus thus formed, one who is not thoroughly conversant with the peculiarities of such conditions would quite likely be surprised to find that a large portion of the bone is dead and perhaps loose in the tissues. It will be found upon observation of processes other than syphilitic which produce necrosis or caries of bone, that there exist prior to the death of the osseous structure quite pronounced objective phenomena in the way of pain, swelling, and deformity of the part, these symptoms indicating the existence of proliferated inflammatory material which subsequently produces by simple pressure destruction of the vitality of the bone. Those morbid phenomena in syphilis which involve bone or periosteum in the early part of the course of the disease are accompanied by relatively more objective phenomena than those late lesions which are now under consideration, yet at the same time they are rarely followed by caries or necrosis. These processes, it seems, are reserved for the late, secondary, or sequelar period of the disease. True, it will be seen that although the local process is apparently more severe in the early cases, destruction of the vitality of the bone is not so likely to occur. There is a marked difference between the nodes and diffuse superosteal swellings of early syphilis and the condition of the bone and periosteum which precedes necrosis *en masse*, or, for that matter, caries in the late stage of the disease. In addition to the disproportion between the degree of destruction of bone and the objective phenomena preceding such destruction, another point worthy of comment is the fact that syphilis possesses the power of dissecting out definite portions of osseous tissue, apparently by cutting off their nutritive supply in as cleanly a manner as it could be done by the knife. He has in his collection specimens of the intermaxillary bone, portions of the alveolar process of the maxilla, the palatal and nasal processes of the superior maxillary, the malar and ossæ nasi, which became necrosed, loosened, and were removed from cases of late syphilis. These fragments of bone present in many instances as natural a conformation as in their healthy condition.

According to his observation, there seems to be in cases of late syphilis a special predilection for those parts supplied by the fifth nerve, indicating that the portion of the sympathetic system which presides over these parts is particularly sensitive to the syphilitic impression. He had found in some instances the tendency to unilateral destruction of osseous tissue particularly marked. Thus, the palatal process of the superior maxilla upon one side or superior alveolus upon one side may necrose and give way without the corresponding portion of bone becoming affected. Indeed, it seems that in most instances in which necrosis attacks the bones of the face it is impossible to check the process until the line of demarkation represented by the anatomical outline of the affected bone has been reached.

Dr. Lydston said he had had several cases recently in which that portion of the superior maxilla corresponding to the intermaxillary bone was dissected out by the syphilitic process with the resultant loss of the incisor teeth, the remainder of the jaw remaining intact. There appears to be a peculiar predilection of late syphilis for this portion of the jaw. He had seen several cases in which caries occurred in this situation with a consequent loss of one or more perfectly healthy teeth. These cases appeared so thoroughly characteristic that he has come to regard the loss of the incisor teeth without any apparent cause as almost positive evidence of syphilis.

An interesting case illustrating the unilateral limitation of some late lesions of syphilis came under his observation recently. This was a gentleman who had an obscure history of syphilis dating some years back. Several weeks before coming under his observation, ulceration began at the roots of the molar teeth upon one side and extended outward upon the palate. When he first saw the case, the ulceration had extended outward upon the hard palate about three-quarters of an inch, and forward to the median line, where it abruptly stopped. The appearance of the ulceration was quite typical; there was no disease of the teeth or jaws to account for it. Healing was quite rapid under appropriate anti-syphilitic treatment.

Another interesting case of somewhat similar character is that of a gentleman who had syphilis seven or eight years ago. For the last three or four years he has had occasional symptoms of the disease. A few months since ulceration occurred about the roots of the upper incisors, and was attended with slight caries of the intermaxillary bone. The process was checked by appropriate treatment, the teeth which were loosened finally becoming perfectly solid. About six or eight weeks after the ulceration was healed, the patient consulted him again for supra- and infra-orbital neuralgia and hemicrania. It yielded readily to iodide of potassium in large doses. Within a few days the patient had again consulted him for paræsthesia of the right side of the face, which he noticed for the first time while being shaved. His face having been excessively tender previously, he very speedily noticed a lack of sensibility under the razor. Associated with this paræsthesia there is obscure pain which he locates back of the eyeball. The *ensemble* of symptoms in this case points to central disturbance, and evidences a manifest predilection of the sequelar lesion for the fifth cranial nerve.

The association of obstinate tubercular syphilides with nervous syphilis is well known. It seems that the danger of involvement of the central nervous system is directly proportionate to that of severe syphilides.

In considering the tropho-neurotic character of the late lesions of syphilis, the fact should not be ignored that syphilis may act directly upon the nervous system in several different ways :

1. By the direct effect of syphilitic deposit upon the nerve-cells or fibers or membranes of the brain and spinal cord.

2. By changes in the membranous envelopes of the brain and spinal cord.

3. By deposits in and about the blood-vessels which induce circulatory disturbances.

4. By a proliferation and condensation of connective tissue which remains after the syphilitic material *per se* has been removed.

There is probably a difference between the late and early forms of syphilitic lesion in the manner in which the tropho-neurotic element is brought about. Thus, it may be due in the first instance to a direct impression of the syphilitic poison upon the sympathetic nervous system ; secondly, to direct pressure upon the nervous structures ; thirdly, to a disturbance of function and nutrition of the nervous structures incidental to interference with blood-supply.

It is probable that mercury acts upon the nervous system very much in the same manner as does syphilis. It is very difficult to differentiate late syphilitic lesions of the bones and of the mucous membranes from those directly due to the action of mercury. That mercury exerts a powerful effect upon the sympathetic nervous system is, it seems, shown conclusively by the phenomena of ptyalism, which cannot be accounted for solely upon the theory of the production of irritation. The well-known power of mercury over the secretions is probably due to its influence upon the sympathetic ganglia. When the injurious action of mercury is superadded to syphilis, there is a more marked tendency to tropho-neurotic phenomena than in well-treated cases of the disease ; the excessive use of mercury often seems to determine the predilection of late syphilis for the bones of the head and face. It is quite as capable of producing necrosis or destructive ulceration of these parts as is syphilis *per se*.

Positive demonstration of the dependence of the phenomena here outlined upon nervous disturbance is of course difficult, but the inferences drawn appear to be logical.

In considering the question of trophic disturbances in their relation to destructive syphilitic processes, it is well to remember the familiar physiological experiment of section of the sympathetic in the neck of the rabbit. The same experiment is also interesting as bearing upon the faucial congestion of early syphilis. The reddening of the ear of the rabbit, the inflammation and sloughing of the cornea incidental to section of the sympathetic, are certainly suggestive. To carry the analogy of this physiological demonstration a little further, he called attention to the serious corneal trouble which sometimes results from herpes frontalis and orbicularis.

The tropho-neurotic influence of syphilis seems to be chiefly manifested in the peripheral structures of the body. Thus, in late syphilis we have a tendency to brittleness and other morbid changes of the finger- and toe-nails. There is falling of the hair due to intrinsic perversion of vitality of the hair-follicle, and differing from alopecia areata of the early stages of the disease.

The most important evidence of the tropho-neurotic influence of syphilis is the malnutrition of the teeth observed in syphilitic children. Syphilis may impress several generations of individuals with a tendency to tropho-neurotic changes of the glands, teeth, nails, etc., long after syphilis *per se* has been eradicated. Scrofula, he thought, is frequently the result of this neurotic tendency to tropho-neurotic disturbance.

In a paper read before a section of the American Medical Association, June 12, 1886, Dr. Lydston had directed attention to the close similarity which exists between so-called canker of the oral cavity and certain syphilitic lesions. This resemblance he believed to be due to the fact that both are the result of tropho-neurotic disturbances : in the one case produced by syphilis, or syphilis and mercury combined, and in the other to general perversion of nutrition, or more frequently disturbance of the digestive apparatus.

Dr. Haddon reports (in the London *Lancet*, January 25, 1890) four cases which the essayist believed to be due to tropho-neurotic disturbance. These cases were absolutely resistant to treatment, and consisted of a sensation of intense unbearable burning of the tongue, and often of the lips and roof of the mouth. In two of these cases there were certain objective symptoms. In one, a woman of thirty-five, there was a small epulis ; in another, a woman of seventy-five, who was emotional and nervous and had for many years suffered from nettle-rash, the gums finally became involved and the teeth turned black and decayed.

Discussion.

Dr. J. Taft said the point he was specially interested in was the virus force of transmitted syphilis and the relative effect it had on the soft and hard tissues. He had often questioned whether cases of stubborn diseases of the gums and soft tissues of the mouth were not caused by transmitted syphilis. He desired to hear from Dr. Lydston on that point.

Dr. Lydston said that he had not given this special point much consideration, but there is not so marked a tendency in syphilis to affect the soft parts as the bones. It may be, however, that in the adult the use of alcohol and tobacco, and the lodgment of decomposing material in different parts of the mouth, determines to some extent the place of attack. He was not sure of this. Constitutional syphilis so called is, however, not always syphilis, though it is a sequela or result of the disease ; it may be only a perverted nutrition, or a decided lowering of the vitality. We must also understand properly the terms we use. Congenital syphilis is common enough : the child is born with syphilitic sores, or they appear shortly after birth ; fortunately, death usually ensues within a few days or weeks. This is not *inherited syphilis*, but the child caught the disease from contact with the diseased mother as certainly as the mother caught it from diseased contact. Sometimes the child is diseased, though the mother escapes the infection. It is strange that this is possible, but we know it is. A woman infected between the second and the seventh month of pregnancy may show no sign of the disease, but the child will be thoroughly contaminated. Now, on the other hand, if the parents have or have had syphilis, the child will, in consequence of the disease of the parents, be born with lowered vitality and perverted nutrition, which will show itself in one or more of a great variety of ways. It may be scrofulous or hydrocephalic, or be rachitic. The teeth of the child will show the Hutchinsonian marks, or it may be subject to tuberculosis. All or any of them may be inherited sequelæ of the parental syphilis, but they are not syphilis. Inoculation with the blood from such a child will not convey syphilis.

Dr. E. S. Talbot said there were points in the paper in line with work that he is doing. The action of syphilis on the bones of the face, rather than on the other bones of the body, is not to be questioned. The bones of the face are more frequently attacked than other bones because they are more vascular in structure, but generally it is only certain parts of them that are affected ; sometimes only one or two teeth are lost. Now, the vascular structure is no less in one part of the process than in the other. Those who had read his papers on irregularities of the teeth would remember that he had noted the effects of the eruptive fevers, and shown how the child will be stunted thereby. These causes may operate either before or after birth, and the maxillary bones may be contracted by reason of these fevers. The child of a parent having these diseases may be affected by arrest of development caused by the disease in the parent. Irregular teeth are not inherited, but the insufficiently-developed jaw-bone is. This is well shown in cases of idiots ; there is no better place to study irregularities of the teeth and jaws than among the idiotic and imbeciles. As Dr. Lydston has shown, it is not syphilis which is inherited, but the result of the disease in the parent is an arrested or diverted development or function.

Dr. J. L. Williams spoke of the mistake often made in attributing the arrest of development to syphilis, when it may as well have been caused by some infantile disease. For instance, the peculiarity of the teeth known as "Hutchinson's teeth" may result from any infantile disease which will arrest the development.

Dr. W. H. Morgan said that his observations on this line had been narrow. He thought that when the parents had been affected with syphilis and had been cured, the children born many years afterward would show some form of constitutional tendency which they would not have had otherwise. The condition which we call strumous is probably a sequela of syphilis in the progenitors. An abscess in a child with this condition will be found to be about twice as big as it would in another child, and twice as long getting well.

(To be continued.)

POST-GRADUATE DENTAL ASSOCIATION.

The annual meeting of the Post-Graduate Dental Association of the United States was held at Chicago, Ill., June 25, 1890, and the following gentlemen were elected officers :

George H. Cushing, M.D., D.D.S., president, Chicago, Ill.; Dr. R. H. Cool, vice-president, Oakland, Cal.; Lewis S. Tenney, D.D.S., secretary and treasurer, Chicago, Ill.; R. B. Tuller, D.D.S., Chicago, Ill., Dr. J. M. Gallehugh, Chenoa, Ill., and Dr. G. W. Milton, Silvertown, Col., executive committee.

This association is but a year old, but it starts out with good prospects of becoming a large and popular national organization, and has a grand work before it. Its object, aside from the same general one of most dental societies, is to particularly encourage and stimulate post-graduate studies, and the establishment of facilities for the same in dental colleges. It also contemplates, when its membership will admit of it, establishing a systematic course of home study, with benefits not unlike the Chautauqua Literary Society, perhaps ; but the plan is not yet sufficiently developed to admit of outlining at this time.

While the name "Post-Graduate" would imply an association of graduates only, the broad view is adopted of extending the work among all legal practitioners who may desire to join and co-operate, but practitioners not graduates are not eligible to membership until they have passed a post-graduate or practitioner's course in some reputable and recognized dental college.

Members of the profession who desire to become members of the Post-Graduate Association should correspond with the secretary, Dr. Lewis S. Tenney, 96 State street, Chicago. The membership fee is one dollar ; annual dues, payable in advance, one dollar. Certificates of membership are issued when the member duly qualifies. Membership may be obtained through correspondence, when evidence of eligibility is presented.

MICHIGAN STATE DENTAL ASSOCIATION.

At the June meeting of the Michigan State Dental Association the following resolutions were passed :

Resolved, That the Michigan Dental Association heartily approves the aim and plan of the Dental Protective Association ; and it is further

Resolved, That it is the duty of every member of the dental profession in this State to join the Dental Protective Association. It is also

Resolved, That Dr. Crouse be requested to furnish the dental journals with an abstract of his remarks for publication.

W. H. Dorrance, W. D. Saunders, and Dr. Douglas, committee.

William Cleland, *Secretary*, Detroit, Mich.

The following are the principal points of the remarks of Dr. J. N. Crouse, of Chicago, alluded to in the resolutions :

First, that, by combining in some such an organization as the Dental Protective Association, the strength of ten thousand men is bound into one, and all defense necessary is made with but little more expense than would be required for an individual. The preparation of one case will answer for all, and all evidence can be collected better by an association than in any other way.

Second, that it is very important that all get into the association at this time, for the reason that an appealed suit to the Supreme Court, before the formation of the association, will probably be decided in favor of the Crown Company, owing to deficiency of evidence and imperfect presentation. If the Crown Company win this suit, they will send notices all over the United States, thereby demoralizing the profession and causing many to pay them money who should be in the association and thus avoid that calamity.

The Protective Association will be ready with new evidence and a new record, and can take care of its members against any claims of the Crown Company. If a dentist is not in the association, it will not take care of him when the time comes.

NORTH CAROLINA STATE DENTAL ASSOCIATION.

THE sixteenth annual meeting of the North Carolina State Dental Association was held in Wilmington, N. C., June 24 to 27, 1890.

The following officers were elected for the ensuing year: H. C. Herring, president; J. E. Wyche, first vice-president; J. D. Harper, second vice-president; C. A. Rominger, secretary; J. W. Hunter, treasurer; Sid. P. Hilliard, supervisor of clinics; J. H. Durham, essayist.

The following resolutions were passed:

WHEREAS, We are desirous of raising the standard of dentistry in North Carolina, and of increasing the individual proficiency of each member of the profession; and whereas, in our opinion, we cannot accomplish this while the colleges encourage young men to enter them from the business avocations of life without any previous office pupilage; and whereas, this is inimical to the spirit of our constitution and by-laws; therefore

Resolved, First, that we, the North Carolina State Dental Association, offer our protest against any college that shall discourage office pupilage before entering college; Second, that we will use our influence against any college or college professor who shall thus lower the standard of dentistry, or who shall knowingly receive a pupil from our State without two years' office pupilage in accordance with our constitution and by-laws; Third, that a copy of these resolutions be sent to the leading journals for publication.

H. C. HERRING, *President.*
C. A. ROMINGER, *Secretary.*

The next meeting will be held in Durham, beginning on the first Tuesday in May, 1891.

C. A. ROMINGER, *Secretary*, Reidsville, N. C.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will meet on Monday, August 4, 1890, at 10 A.M., at Excelsior Springs, Mo.

JOHN S. MARSHALL, *Secretary*,
Michigan avenue and Jackson street, Chicago, Ill.

Virginia State Dental Association and Examining Board.

The twenty-first annual meeting of the Virginia State Dental Association will be held in the High School Building, Roanoke, Va., commencing Tuesday, August 26, 1890, at 9 o'clock A.M.

A large and interesting meeting is anticipated. Members of the profession are invited to attend, and will receive a cordial welcome.

J. Hall Moore, *Cor. Secretary*, Richmond, Va.

The State Board of Dental Examiners will meet at the same time and place, for the examination of candidates to practice dentistry in the State. All applicants must be graduates of some reputable dental college.

W. E. Norris, *Secretary*,
Charlottesville, Va.

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DENTAL COLLEGE COMMENCEMENTS.

University of Michigan—Dental Department.

The annual commencement exercises of the Dental Department of the University of Michigan were held, in connection with those of the other departments of the university, at Ann Arbor, Mich., on Thursday, June 26, 1890.

The commencement oration was delivered by Andrew D. White, LL.D.

The degree of D.D.S. was conferred on the following graduates in the dental department:

William R. Calhoun.
Leo David Camp.
Ernest Catt.
Charles Eli Collamer.
Charles Floyd Cook.
George Howe Copp.
Norman Kershaw Cox.
Charles Hugo Farman.
Fred. Dawson Fisher.
Ida Gray.
John Jarius Green.
John Joseph Giusti.
Bertrand Francois Hall.
Edgar Allen Honey.
William George Howley.
John Barnet Keesing,
Carolyn Murray McElroy.
Melville Arthur Mason.
Chester C. Merriman.
Eli Louis Moore.
George Northcroft.
Henry Turner Osborne.
James Andrew Oswald.
Albert John Rust.
Charles B. Scudder.
Alice Lovyse Sherman.
William Hall Sieberst.
Fred Cameron Sizelan.
Mortimer F. Stever.
Fritz Bernhart Tegener.
George T. Thuerer.
Howard D. Van Antwerp.
Gerrit Henry Veldhuis.
John Hardin Waterhouse.
Charles Elmer Welch.
Gordon William Welch.
Harry Lloyd Williams.
Paul Woolsey.

Harvard University—Dental Department.

The annual commencement exercises of the Dental Department of Harvard University were held in Sanders Hall, Cambridge, Mass., in connection with those of the other schools of the university, on Wednesday, June 25, 1890.

The number of matriculates for the session was thirty-four.

The degree of D.M.D. (dentariæ medicinæ doctor) was conferred on the following graduates by Charles William Eliot, LL.D., president of the university :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Sidney R. Bartlett	Massachusetts.	Arthur J. Oldham	Massachusetts.
Harry O. Bixby	New Hampshire.	Hermann Paal	Germany.
Benj. H. Codman	Massachusetts.	Charles E. Perkins	Massachusetts.
Edwin H. Dixon	Maine.	Oscar Pulvermacher	Germany.
Arthur W. Eldred	Massachusetts.	Edward Rolfe	Chili.
Charles M. Keep	Massachusetts.	Elbridge A. Shorey	New Hampshire.
Chas. Elmer Luce	Massachusetts.	Frank T. Taylor	Massachusetts.
Kotai Masuda	Japan.	Charles B. Titcomb	California.

BOSTON DENTAL COLLEGE.

THE twenty-third annual commencement exercises of the Boston Dental College were held in Berkeley Temple, Boston, Mass., on Wednesday, June 18, 1890, at 8 P.M. The annual address was delivered by Rev. A. E. Wenship, and the valedictory by Wallace Bardeen, D.D.S. The number of matriculates for the session was eighty.

The degree of D.D.S. was conferred on the following graduates by I. J. Wetherbee, D.D.S., president of the college :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Herbert W. Adams	Massachusetts.	Lewis E. Lamson	Massachusetts.
Walter H. Arnold	Massachusetts.	John H. Martin	Maine.
Wallace Bardeen	New York.	George H. Newland	Vermont.
J. Winslow Bailey	Massachusetts.	Edward J. Palmer	Massachusetts.
George F. Beard	Massachusetts.	Benj. A. Phillips	Massachusetts.
George W. Bosworth	Massachusetts.	Annie F. Reynolds	Massachusetts.
Alpheus R. Brown	Massachusetts.	Ralph F. Runals	Massachusetts.
William J. Currie	New Brunswick.	Frederick A. Sawyer	Massachusetts.
Ernest E. Gleason	Massachusetts.	Charles W. Tobin	Massachusetts.
L. L. Greeley	Massachusetts.	Charles P. Vesper	Massachusetts.
Chas. W. Hammett	Massachusetts.	Adolph Wengenroth	Germany.
Patrick I. Kelley	Massachusetts.	Fred. M. Whitehouse	
William N. Kidder	Massachusetts.	Auville L. Whitney	Maine.
Edwin F. Lamson	Massachusetts.	Sumner P. Willard	Massachusetts.

UNIVERSITY OF MINNESOTA—COLLEGE OF DENTISTRY.

THE annual commencement exercises of the College of Dentistry of the University of Minnesota were held, in connection with those of the other departments of the institution, in the auditorium of the university, Minneapolis, Minn., on Thursday, June 5, 1890. The number of matriculates for the session in the dental department was thirty-two.

The degree of D.D.S. was conferred on the following graduates by Cyrus Northrop, LL.D., president of the university :

NAME.	STATE.	NAME.	STATE.
Clinton S. Deitz, M.D.	So. Dakota.	Charles A. Van Duzee	Minnesota.
Wm. Herbert Dunn	Minnesota.	Franklin R. Wright	Minnesota.
Arthur E. Peck	Minnesota.	Edith H. White	Minnesota.

LOUISVILLE COLLEGE OF DENTISTRY.

THE annual commencement exercises of the Louisville College of Dentistry (Dental Department of the Central University of Kentucky) were held at Macauley's Theater, Louisville, Ky., on Tuesday, June 17, 1890.

The address on behalf of the faculty was delivered by Francis Peabody, D.D.S., and the class valedictory by J. M. Meyer, of Ohio.

The number of matriculates for the session was fifty-six.

The degree of D.D.S. was conferred on the following graduates by Rev. L. H. Blanton, D.D., chancellor of the university:

NAME.	STATE.	NAME.	STATE.
W. E. Baxter	Kentucky.	G. N. Matzger	Washington.
P. W. Bushong	Kentucky.	J. M. Meyer	Ohio.
H. E. Eaken	Indiana.	Henry Pirtle	Kentucky.
J. E. Entsminger	Illinois.	R. M. Stewart	Georgia.
E. A. Fewell	Indiana.	B. M. Smith	Illinois.
J. R. Leezer	Kentucky.	J. R. Wallace	Kentucky.

EDITORIAL.

THE INFLUENCE OF THE COLLEGE.

FOLLOWING closely the increasing recognition in this country of the necessity that a reasonable degree of mental education shall be general, is a growing demand for the elevation of the standard of special education,—a demand which has resulted in the announcement that at the end of the present collegiate year a three years' course will be required as a preliminary to dental graduation. There is thus good reason to believe that there will be a marked advance in the direction of a broader education. The benefit of this extension of the curriculum will not be limited to those directly interested as students in the change; in some degree it will be felt by all who are engaged in the practice of dentistry. The influence of a college in successful operation is not confined to its matriculates, but has an important bearing on the entire profession, as well as upon the general public. Its energies are felt in sister institutions, and form to a considerable extent the estimate in which that profession is held by the community at large.

Another and a notable result will in due course follow. Improved graduates will make not only improved practitioners, but improved instructors and improved authors. It is not, therefore, a mere increase in the number of more liberally educated dentists which is to be the outcome of the change noted, but an elevation of the general tone of the profession, and a consequent and deserved advance in the estimation of the community.

The duty of each and every college in the association is plain; the spirit, as well as the letter, of the compact should be rigidly adhered to. More and more each year the professional estimate of educational institutions is based not on the number of graduates, but on the qualifications of those who bear their diploma, and the law of evolution—the survival of the fittest—will assert its supremacy. The profession have it largely in their own hands to determine the character and competency of the future practitioners of dentistry.

DENTAL HOSPITAL AND COLLEGE IN AUSTRALIA.

We are in receipt of a circular of the Dental Association of Victoria, through Mr. George Thomson, L.D.S., secretary, which informs us that the council of the association has, after careful consideration, come to the conclusion that it is essential that a dental hospital and college should be established in Melbourne. General hospitals afford relief by extraction only, while modern progress recognizes the preservation of the teeth as the most useful and important office of dentistry, and the need is pressing for the establishment of a separate institution where the poor can have dental service. It is the intention to make the proposed institution both a college and a hospital, the passage of the dentists' act of 1887, with the regulations framed under it relating to the future education of dentists, having made the immediate establishment in Australia of a dental college, from an educational point of view, a necessity. Liberal subscriptions have already been made by members of the association, and the public are invited to assist them in their laudable work. We wish them success.

DENTAL COLLEGE ANNOUNCEMENTS.

We are frequently applied to for information about dental colleges which the possession of their announcements would enable us to answer satisfactorily. The executive officers of the various schools will confer a favor on us, and serve their own interests as well, by forwarding to us copies of their announcements as soon as issued.

DR. MILLER'S CONTRIBUTIONS.

This number contains a very valuable paper by Dr. Miller on antiseptics in the treatment of diseased teeth, which is timely, and will undoubtedly command the earnest attention of the profession. We reluctantly make a break in his series on the tusks of the elephant, but the continuation will be taken up in our next issue.

We have assurances from many leading men in the profession that

Dr. Miller's investigations are being widely appreciated, and it is a great satisfaction to us to be able to lay before the readers of the Dental Cosmos his progressive work.

DR. GIBSON'S MONOGRAPH.

To all dentists, especially those located where surgical skill is not available, the descriptions and illustrations of Dr. Gibson's paper may at any time prove to be of inestimable value. This monograph is itself worth the cost of a year's subscription to the Dental Cosmos.

OUR CROWDED PAGES.

We have in hand and in type, matter which even our ample pages cannot immediately accommodate. We ask the patience of contributors until we can give all of them a hearing.

EDITORIAL CORRESPONDENCE.

Atlanta, Ga., July 16, 1890.

At the session of the Southern Dental Association held July 16, 1890, the following preamble and resolutions were passed unanimously, and the president appointed the following committee in accordance therewith: L. D. Carpenter, Atlanta, Ga.; J. Y. Crawford, Nashville, Tenn.; J. Taft, Cincinnati, O.; C. S. Stockton, Newark, N. J., and W. J. Barton, Paris, Tex.

Whereas, There is to be a World's Columbian Exposition in Chicago in 1893; and whereas, in consequence of the fact that the choicest products of the world are to be there displayed, it is expected that citizens in large numbers of all civilized countries will be gathered together there for the purpose of seeing these exhibits; and whereas, it is to be presumed that many dentists from foreign countries will visit the United States at that time; and whereas, the time of the exposition will be an opportune occasion for a great meeting of dentists of the world; and whereas, it is believed that a great advance in the science and practice of dental and oral surgery would result from a meeting of the dentists of the United States with those from foreign countries who might then be visiting this country; and whereas, it is desirable that any meeting then held should be at the instance of the American Dental Association and the Southern Dental Association, and organized by a joint committee by them appointed; therefore be it

Resolved, That the president of this association appoint a committee of five, to confer with a like committee that may be appointed at the next meeting of the American Dental Association upon this subject, and that this joint committee have power to fill all vacancies, and shall add to its membership either one, three, or five more members as it may deem advisable; and when this committee is so completed it shall be clothed with full power to take such action as it in its judgment may deem best for creating an organization for the purpose of holding a dental meeting in Chicago in 1893, which the reputable dentists throughout the world shall be invited to attend, and that any action that this committee may take in the premises shall be final and binding.

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BIBLIOGRAPHICAL.

Irregularities of the Teeth and their Treatment. By Eugene S. Talbot, M.D., D.D.S., Professor of Dental Surgery in the Woman's Medical College, Lecturer on Dental Pathology and Surgery in Rush Medical College, Chicago. Second Edition, revised and enlarged, with 234 illustrations, 169 of which are original. Octavo, pp. 257 and index. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $3.00.

The readers of the Dental Cosmos are already somewhat familiar with Dr. Talbot's theories and recommendations of practice relative to irregularities of the human teeth. All other dentists, and those preparing to become dentists, should know that this book is indispensable to the practitioner of modern dentistry. The varied requirements in the practice of orthodontia make it necessary that the operator should have at command every attainable resource, and the two hundred and thirty-four illustrations in this book so graphically reinforce and exemplify the descriptive and explanatory matter that he must indeed be poorly qualified who does not find here suggested a means for the intelligent treatment of almost any case. Not only are the exigencies of practice provided for, but the professional spirit is stimulated by the valuable historical data, and by the record of observations and reflections that throw much light on the obscure etiology of dental irregularities. Much credit is due to Dr. Talbot and his acknowledged assistants in the production of this volume.

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HINTS AND QUERIES.

In the May number of the Dental Cosmos for this year, page 397, Dr. M. L. Rhein suggested chloride of methyl for sensitive dentine, but did not state how to use it. Is a *special* spray-producing apparatus necessary?—Dr. Amend, Metz, Germany.

To Control Occlusion.—What is the best method of inducing, or directing, a patient to bite so as not to throw forward the lower jaw when the occlusion is to be taken in wax for prosthetic purposes?—G. M. M.

Lateral Movements of Roots of Teeth.—Several members of the dental profession have recently written to me inquiring whether I think it is possible to laterally move the apical extremities of the roots of teeth in correction of irregularities, and also asking whether such lateral movement has actually been accomplished. Assuming that other dentists might be equally interested in the matter, I take this means of publicly replying to the questions.

Yes, the lateral movement of roots of teeth is possible by proper apparatus. I have successfully performed the operation several times. The first operation of the kind was performed by me. It was the case of George Lockhart, Jr., published about eight years ago in a series of papers on the subject in the Dental Cosmos, beginning June, 1882. [See vol. xxiv, p. 190.]—J. N. Farrar, M.D., D.D.S.

Kyanized Wood Points.—For those who prefer to fill root-canals with wood points it is suggested that these be first soaked for several days in a 5 to 1000 aqueous solution of mercuric bichloride, and then thoroughly dried by the application of heat, as by placing them in an open bottle floating in hot water. A few shot in the bottle will maintain it in a vertical position in the water. The points will thus be rendered absolutely aseptic, and they may be used in combination with chloro-percha, beeswax, or any suitable accessory.

About a hundred years ago, Mr. John H. Kyan devised a like method for the preservation of ship timber and wood employed for other purposes, and the term kyanizing was hence given to his process. It is obvious that the duration of the old-fashioned wood pivots would be increased by similar treatment, to say nothing of the probable prevention of the usual odorization. The process is also applicable to wood wedges for separating or regulating teeth. —W. S. H.

Extraction of Buried Roots.—Fully thirty-five years ago I devised and thought of patenting just such instruments as I now see illustrated in the S. S. White catalogue as Morrison's reamer and screw portes, for the extraction of roots buried so far under the gum that forceps will not grasp them except the gum be first slit or cut away. This gives so much pain that few will bear it patiently, whereas by painlessly reaming the root-canal, and turning in a screw porte, the root, or tooth which is such a shell that the forceps would surely crush it, can be pulled out certainly, and with the least possible pain to the patient. I thought myself entitled to the credit of inventing these instruments, but am recently told that they have been many years on the market in this and in foreign countries. Yet among my professional friends I have not found one who knew of these extractors, which I could not think of doing without.—David Marshall, Carthage, Ind.

To the Editor of the Dental Cosmos:

Sir,—Please correct Dr. Howard, where he intimates, on page 460 of the June number of the Dental Cosmos, that the Alumni Association of the Dental Department of the University of Pennsylvania is the only association of the kind having a code of ethics. The Alumni Association of the New York College of Dentistry has a code of ethics which is published with its constitution, and which is enforced. I think *all* such societies have their published codes.—F. A. Roy, New York, N. Y.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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THE

DENTAL COSMOS.

VOL. XXXII. PHILADELPHIA, SEPTEMBER, 1890. NO. 9.

ORIGINAL COMMUNICATIONS.

STUDIES ON THE ANATOMY AND PATHOLOGY OF THE TUSKS OF THE ELEPHANT.

BY W. D. MILLER, M.D., D.D.S., BERLIN.

(Continued from page 526.)

3. *Abscess-Cavities in Ivory.*

It is a very common occurrence for turners in ivory to meet with cavities of varying size and shape in the solid tissue of the tusk. Sometimes these cavities communicate with the pulp-chamber and occasionally with the outer world; usually, however, they are completely isolated.

The cavity has in most cases a sub-cylindrical form, its longer axis being parallel with the axis of the tooth. It may, however, be very irregular in shape and divided into a number of compartments by partitions of osteo-dentine, or contain cylindrical columns of osseous substance crossing from one wall to the other. The surface of the cavity is usually rough and chalky, and shows here and there remains of organic matter.

These cavities are frequently very offensive to the smell, and no one questions the fact that they are the result of abscesses during the life of the tusk.

Regarding their origin, however, the same differences of opinion formerly existed, and to a certain extent still exist, as were referred to in connection with the processes of repair in gunshot- and other wounds. Some maintain that they are formed in the ivory itself, independently of any connection with the pulp or pericementum; in other words, that ivory is capable of undergoing inflammation, suppuration, and repair in a manner similar to soft tissue (Heitzmann and

Boedecker). Others maintain that abscesses are the result of suppurative processes in the pulp or pericementum, in which the hard tissues of the tooth remain entirely passive. The latter view is held by nearly all writers of celebrity on the subject.

Fig. 41 shows what may be called the typical appearance of a cross-section of a full tusk containing an abscess-cavity. It will be seen that the layer of ivory (*a*) between the cavity and the surface of the tusk is normal in structure, though we occasionally find it lined with a thin, irregular deposit of pathological ivory. This layer represents the thickness of the wall of the tusk at the time the abscess was formed, in this particular case the pulp then having a radius of one and a half inches at this point.

FIG. 41.

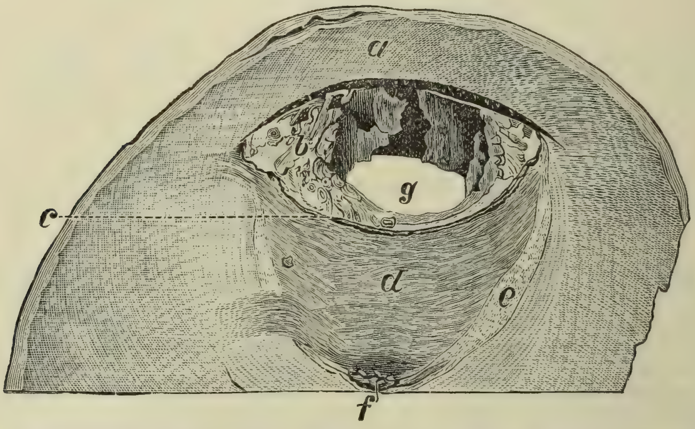

FIG. 41.—Part of a cross-section from a full tusk. *f*, heart or center of the tusk; *g*, abscess-cavity; *c*, stratum primitivum; *b*, conglomerate; *d*, centrifugal ivory; *e*, vaso-dentine.

The other sides of the cavity are lined with a layer of very irregular, more or less pigmented, streaked, and knotty conglomerate of a bony appearance (*b*), often improperly designated as osteo-dentine, a tissue containing bone-lacunæ being only one of the constituents of this substance.

Bordering on this conglomerate and separating it from the comparatively normal ivory, is a thin, semi-transparent stratum about one millimeter in thickness, of a brownish color (*c*); following this comes a tissue (*d*), which, under the microscope, appears as perfectly normal ivory, whereas to the naked eye its appearance deviates in a remarkable manner from that of the normal cross-section, resembling much more closely a longitudinal section. This appearance will be observed in the case of all abscesses, fractures, or wounds which have been healed by the pulp in the manner illustrated in Figs. 44 and 45, and is to be accounted for, as I conceive, by the fact that the ivory is deposited upon a convex and not upon the normally concave surface.

The tubules start out from the stratum *c* at right angles to it, not converging toward the center of the tusk, but *diverging* from the center of the circle of which the stratum *c* forms an arc. The tissue lying between the stratum *c* and the center of the tusk is therefore deposited, particularly in the outer portion, not centripetally but centrifugally, and may for the purpose of distinction be designated as *centrifugal ivory*. It will often be found to be separated from the normal by a zone of vaso-dentine (*e*).

The semi-transparent stratum *c* represents the first partition or wall deposited by the pulp to shut off the abscess. After this wall has been deposited, the diseased portion of the pulp may still keep up its communication with the main body at some point or other, usually at the end toward the base of the tusk.

FIG. 42.

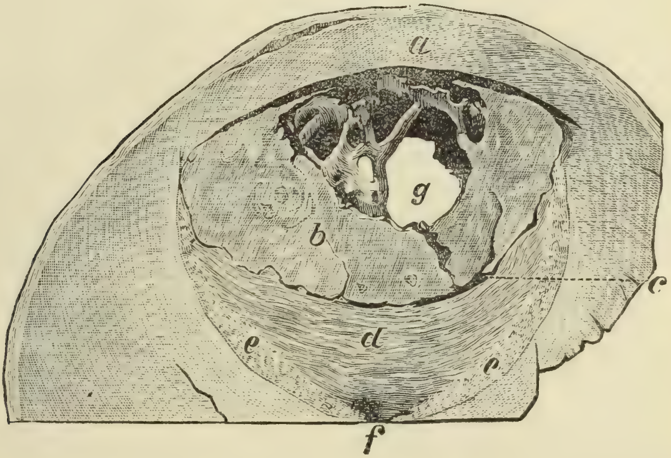

FIG. 42.—Appearance of the abscess illustrated in Fig. 41 about an inch nearer the base of the tusk. *g*, abscess-cavity; *b*, conglomerate; *c*, stratum primitivum; *d*, centrifugal ivory; *e*, vaso-dentine.

In this case, provided the inflammation is not of too acute or intense a nature, the abscess-cavity may become partially and now and then almost completely filled up with the conglomerate *b*. The portions last deposited are, however, exceedingly pliable and chalky, and may be readily scratched out with the point of a knife. They consist only of the calcified remains of pulp-tissue.

In Fig. 42 we have a cross-section showing the appearance of the same cavity about an inch nearer the base of the tusk.

We see here the same transparent zone (*c*); the large mass of conglomerate (*b*), with pillars of the same material crossing the cavity; the centrifugal ivory (*d*), and the vaso-dentine (*e*) separating the centrifugal from the normal ivory. Two inches nearer the base of the tusk a wall of dentine was placed diagonally across the end of the abscess, thus entirely cutting off its communication with the pulp.

Fig. 43 represents a cross-section of a hollow tusk, containing a large abscess-cavity (*p*, pulp-chamber). We notice that the ivory is markedly bulged toward the pulp-chamber, on the side next to the abscess. This bulging is a constant feature in all abscess-cavities, though in full tusks (as Figs. 41 and 42) it may be lost to sight. Here again we find the semi-transparent stratum (stratum primitivum), the conglomerate, and the centrifugal ivory.

FIG. 43.

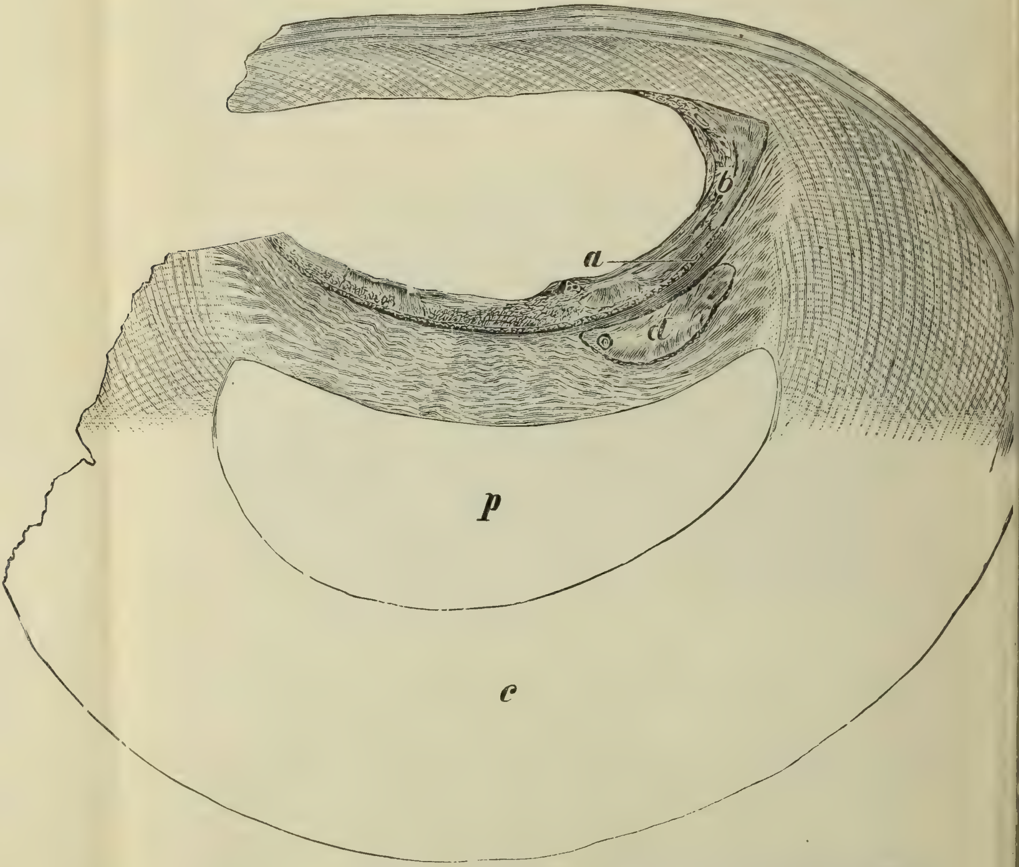

FIG. 43.—Cross-section of a hollow tusk with a large abscess-cavity, showing the primitive stratum *a*, the conglomerate *b*, and the centrifugal ivory (between *a* and the pulp-chamber). *d* indicates a recurrence of the inflammatory process.

In this case, after the abscess had been completely separated from the pulp, a disturbance reappeared at the point *d*, which was not, however, severe enough to lead to a destruction of pulp-tissue.

Fig. 44 illustrates a small piece of ivory, showing the result of an extensive inflammatory process at *a*, and a small abscess-cavity at *b*.

FIG. 44.

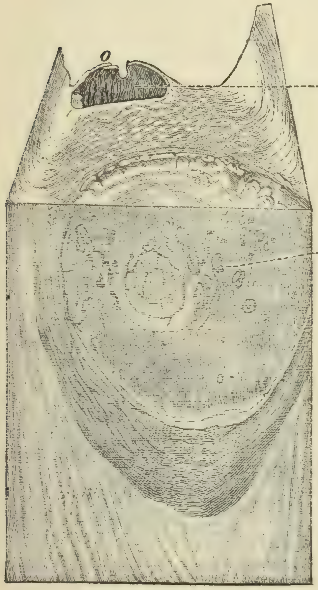

FIG. 44.—Piece of ivory with small abscess-cavity at *b*. *o*, stratum primitivum not quite complete; *a*, results of an earlier inflammatory process.

FIG. 45.

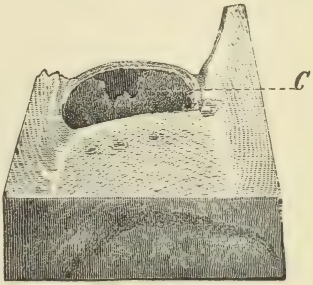

FIG. 45.—Abscess-cavity found adjacent to the one represented in Fig. 44. Here the primitive stratum is complete, and the abscess-cavity (*c*) thereby separated from the pulp-chamber.

The pulp at the time of the death of the animal was engaged in forming a partition (stratum primitivum) to shut off the abscessed portion, and had almost accomplished its object, the communication being still kept up only through the small opening at *o*.

In Fig. 45 we see the same process a little further advanced. Here the partition is perfect and the abscess-cavity completely shut off from the pulp. Naturally no production of the conglomerate on the inner walls could here take place. If the death of the animal had not occurred, the pulp would have gone on filling up the pulp-chamber with ivory, leaving the abscess-cavity behind in the solid tissue.

In Fig. 46 we have a longitudinal section through the wall of a tusk containing an abscess two and three-quarters inches long, situated very near the base of the tusk. *a*, *b*, *c* shows the section of the wall at the time the disturbance in the pulp began. The part *a*, *d*, *e*, *f* was deposited subsequent to the formation of the abscess.

We notice that the stratum primitivum here sends processes into the abscess, dividing it into a number of compartments; and from these processes (as centers of ossification) a conglomerate substance has been deposited, which fills up a considerable portion of one end of the cavity. In the end toward the base of the tusk only an exceedingly thin layer of conglomerate has been deposited, most probably because of the early complete isolation of the diseased part by the stratum primitivum. The bulging of the ivory toward the pulp-chamber at *g* is here again very marked.

Having examined these few specimens, we now ask the question, How are such abscess-cavities in solid ivory to be accounted for?

It is more than probable, however, that the reader will have had no difficulty in framing an answer for himself. The lesson taught by the two preparations 44 and 45 is so plain that I doubt if there can be any difference of opinion regarding it. No one, I think, can have the hardihood to deny that these two abscess-cavities are the result of disease of the pulp and not due to inflammatory processes in the ivory itself.

As for the preparations illustrated in Figs. 43 and 46, those who would have us believe that these abscesses, at least, were formed by inflammatory and suppurative processes in the solid ivory, do not even attempt to account for the constant bulging of the ivory toward the pulp-chamber. Were we even to acknowledge the truth of the very doubtful suggestion that this bulging is due to the pressure of gases accumulating in the abscess-cavity, we would be at a complete loss to tell why the outer wall was not correspondingly driven outward.

FIG. 46.

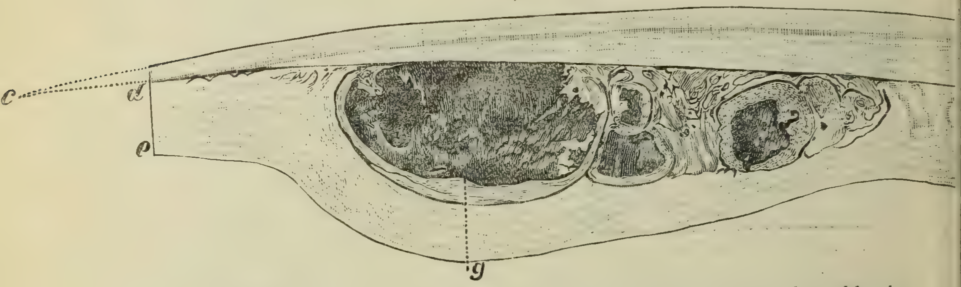

FIG. 46.—Longitudinal section of an abscess-cavity, with numerous partitions formed by the primitive stratum. (See text.)

The eburnitis theory equally fails to account for the appearance of the centrifugal ivory and the vaso-dentine (Fig. 41, *d*, *e*). It also fails to tell us why, for example in Fig. 43, the two walls bordering on the abscess-cavity are equal in width to the wall *c*, which would not be the case if the abscess-cavity represented a loss of substance through suppuration in the ivory itself.

As for myself, after having examined not alone the few specimens illustrated in this article, but over one hundred cases of abscess-cavities in elephants' tusks, I have seen no case where there was even the shadow of a reason for ascribing the power of inflammation, suppuration, and repair to ivory.

Add to this the facts established in the foregoing chapter regarding the complete lack of inflammatory reaction of ivory in the presence of mechanical irritants of every nature, and I think we must all agree that to argue inflammation of human dentine on the ground of analogy with ivory is a rather dangerous proceeding for the devotees of eburnitis.

(To be continued.)

ARE MAN'S DENTAL ORGANS THE RESULT OF THE PROCESSES OF EVOLUTION?

BY T. DWIGHT INGERSOLL, ERIE, PA.

THE matter of which this globe is composed having been once in a nebulous or incandescent state, and each atom widely separated from every other atom by the infinitely elastic and universal ether, hundreds of thousands of years may have elapsed before any plant or animal or any living thing came into existence. The heat was too intense for any kind of life. The various elements had not sought out their respective points for concentration, and the rocks were still in progress of crystallization. Cosmic matter was in a formative state. In time transformation after transformation took place ; temporary mountains and seas were formed ; the earth became cooler and the climate more temperate. These seem to have been some of the necessary conditions for the simplest kind of life. The introduction of life was not that of an animal or a plant. It was simply a mass of living matter in a semi-fluid state, without the least structure or any constant form. The outline of the border was its only shape, and that was subject to frequent changes, like the outline of a small quantity of water on an oily surface when gently agitated. It was life in a primitive state—typical of all subsequent life. The substance was named sarcode by Dujardin, the French naturalist, more than fifty years ago, after having made a study of it in some of the lowest animal forms ; and Hugo von Mohl, having discovered it later in the cells of plants, named it protoplasm. Subsequently, Max Schultze called attention to the identity of sarcode and protoplasm, and in a short time his conclusion was accepted and confirmed by other naturalists, so that now no one denies the identity of life in the vegetable and animal kingdoms. The substance is now known as living matter or protoplasm, whether it be found in a thin watery state as it occurs in the leaves of Valisneria, or in the dormant embryo state in seeds, or in the pulp of a tooth or the brain of a man. Living matter is endowed with irritability and spontaneity of action, and it is the starting-point in the life of every animal and of every plant. Professor Huxley declared it to be "the physical basis of life."

Protoplasm did not confine itself to the massive or watery state, but assumed first the simplest forms and structures through the force or influence of differentiation, and there followed others in greater variety, increasing in complexity of organization toward perfection through an infinite number of living beings till it culminated in man.

Being impressed with the apparent tendency and habit, even, of nature in bringing into existence new and improved forms, the purpose of this paper is to trace out some of the steps of progress that have been taken in bringing the animal kingdom up to the present plane of perfection, and also to ascertain if possible if man's dental organs are really the result of the processes of evolution.

The introduction of life took place probably in the ancient and warm steaming seas which were formed previous to the present configuration of continents and oceans. Among the earliest forms of life were marine plants and protozoans, the latter being the first to form for themselves a limy covering for their soft, defenseless bodies, as did some other marine animals. Some may perhaps regard a house of lime-salts built over the head of these simple-bodied beings as somewhat typical of the limy covering of a human tooth, though it be only by a stretch of the imagination. Imagination might as well go out in search of a type of the human teeth toward the hinged shells of mollusks, whose serrated edges are so nicely articulated that an intruding enemy might be caught as in the teeth of a steel-trap. But something better is wanted for a type.

The consideration of life thus far has been that which occurred in the ancient Silurian seas, the various forms having been differentiated from the first living matter, the larger animals being mollusks and crustaceans which were introduced at or near the close of the Silurian age. The conditions on which life then depended were too unfavorable for the coming in of a great number of new species of improved structures, but in time the earth became cooler, the land more elevated, and the atmosphere purer, so that the Devonian age was ushered in by a gradual transition of physical causes and events. Life-conditions therefore were more favorable, and a great variety of fishes came into existence. This may seem to some in the profession as of little importance, but the physical transformations that have taken place since the birth of the animal kingdom and the various species that have appeared at different times may be regarded as landmarks in the progress of evolution. It would be well, perhaps, to keep such phenomena before the mind as a preface to those laws which govern life in both kingdoms; the coming-in and the preservation of new species having been, it is scientifically supposed, wholly dependent on the physical forces. The fishes of this age presented a variety of tooth-forms. Some had sharp, brier-like teeth, some were thorn-like, some were conical, while a few had no teeth at all. Among the fishes there lived the cestraciont sharks, who were furnished with a masticating apparatus composed of a pavement of bony pieces of conchoidal form spread over the broad surface of the jaws with the convex sides uppermost. The writer has fossil specimens of such a pavement which he obtained from the subcarboniferous rocks in Iowa in 1873. Other sharks, the Hybodonts, had large lance-like teeth that were nearly flat on the inner side, convex on the outer one, the edges being serrated and set in a row around the border of the mouth. The Ganoids had long, hollow teeth, conical in form, the outer surface being furrowed vertically, while the inner one was deeply corrugated. Teeth in the Devonian age were generally without roots, having only a dermal attachment to the jaw. The pulp was merely a protuberance arising from the jaw and filling an indentation in the base of the tooth. The blood it contained was a cold, transparent mixture of sea-water and living matter. The function of this little vascular body was, doubtless, to keep the tooth in a healthy condition and also (if one or more were lost) to supply material for a new tooth. The nervous influence, if it had any, must be referred back to protoplasm, the characteristics of which are irritability and spontaneity of action.

Among the various tooth-forms that appeared during the Devonian age, not one seems to be typical of man's teeth ; and it would be well to search for a type at some later period in the history of the animal kingdom.

Let us now look at the character of teeth in the carboniferous age. Before me are several fossil teeth of sharks which rise right and left from the base along the smooth but sharp cutting-edges to a point $5\frac{1}{8}$ inches in height, the breadth at the base being $4\frac{1}{4}$ inches and $1\frac{1}{8}$ inches in thickness. They were set in a row around the border of the mouth, edge to edge, like saw-teeth, the inner surface being nearly flat, while the outer one is convex. The teeth are without roots. The enamel is about as thick as three or four leaves of the Cosmos. The teeth were doubtless used in devouring soft-bodied animals, as boneless animals only were in existence when the sharks first came to life. There were other sharks in those days, and there were snakes, alligators, crocodiles, turtles, birds with teeth, and a great variety of other animals, showing various forms of teeth, but there seems to have been no marked progress toward those of man. Attention seems to have been directed more particularly to adaptation of teeth to animal want and necessity than to the fostering of science. As new species came to life, there was some necessity for new teeth. Geologic and climatic changes brought new food and new circumstances, and the first step toward improvement other than adaptation was the addition of a fang or root to a tooth implanted in a socket. The roots at first were straight and of the same size to the extremity, where a cup-shaped cavity covered a rounded pulp. In time other teeth were produced which were hollow, increasing in size from the conical crown to the extremity like the horn of an animal, the pulp filling the root and half the crown and so enlarging the root that the dentine at the extremity was no thicker than a man's thumbnail, as may be seen, for example, in the mouth of an alligator now living. In time teeth became broader, bearing two or more conical points with two or more tapering roots; and later still in the tertiary period, when mammals showed themselves in mammoth proportions, their teeth were also mammoth-like in size; but after a time these animals became extinct without leaving many signs or prophecies of the coming of human teeth.

We now come to the time of the first appearance of the monkey, whose structure was somewhat new to the animal world, and the same may be said of his teeth. They were a silent, untold prophecy of those of the coming man, and they may be regarded as a type. If many of the various forms of previous teeth pointed directly to, and were really typical of, those of the monkey family, it will strengthen the belief that the same type reached forward also to man, whose teeth and structure are similar to those of the monkey. The conical form and the cusp had appeared, the root or fang had been added to the crown and had been supplied with a sensitive pulp and warm, aërated blood, and the crown had been enameled. This, combined with some modifications, was sufficient for an apparent descent through the monkey to the man.

It remains now to speak of man, who is the last and most important animal that ever came into existence. His life is like that which has always animated the animal world, and the action of the nervous system and the brain is similar to that of many of the highest animals. He possesses no important organ that had not already been in use in some form, and as it is not known that he ever had any connection with any other kind of life, the plain inference is that he must have descended like all animals from the first particles of protoplasm through myriads of alchemistic laboratories of life, and he may now be regarded as the refined and crystallized gold of all preceding life.

Embodied in his dental organs are the best features of all previous dentures: the conical aspect having commenced with the fishes, the addition of a root was seen in reptiles, and the particular form and arrangement originated with the monkey family. The blood and nervous influence supplying the pulp must also be an inheritance, having descended as it were from a transparent mixture of sensitive protoplasm and sea-water which circulated in some of the first soft-bodied animals, and subsequently became transformed into cold, red blood in higher animals, and becoming still later the warm, aërated blood of man.

If, now, it be true that the animal kingdom is the result of the action of physical forces (on which is based the doctrine of evolution), and if man really belongs to that kingdom, the facts in regard to his life warrant the conclusion that his dental organs are the result of the processes of evolution.

THE ORIGIN AND EVOLUTION OF THE FACE.

BY ALTON H. THOMPSON, D.D.S., TOPEKA, KANSAS.

(Continued from page 639.)

REGARDING the face in general, in the lowest vertebrates (Mr. Wright, *op. cit.*),—the Tunicates, Acrania, etc.,—those headless vertebrates which are scarcely differentiated from the mollusca and were long classed with them, there seems to be little or no provision for the special senses, and of course no trace of a face. In the lampreys occurs the first indication of a skull, and two eyes are present, the proper vertebrate number. The sharks have the eye and ear organized much like the higher vertebrates. The mouth is placed back of the tip of the snout, and in this class the lower jaw begins to assume the form of the higher vertebrates. Throughout the class of fishes there is little to be learned as to the face. The skull is well developed, the eyes are large and expressionless, and the mouth is moved forward to the end of the snout. In the eels the face has advanced a little, and is nearer the reptile form. Many curious forms of fishes have remarkable, often grotesque, facial forms and expressions,—if such low faces can be said to have expression. Comparative physiognomy could liken them to many curious human physiognomies to which they bear resemblance.

In the Batrachians, intermediate between fishes and reptiles, we find similar expressionless faces, and but little further elaboration for the accommodation of the sense-organs. Being amphibious, however, there begin to be some special structures for nasal breathing. The prominent eyes of the toads and frogs are conspicuous features. The mouth is still a mere slit in the integument for the admission of food, and the outer ear does not yet appear.

In the snakes the face is still an expressionless area of the integument, but the cruel eyes display the vicious passions. Any variation of expression in the ophidia is in the degree of the vindictive emotions—

they live to kill. In the lizards begins the first suggestion of expression of the better emotions, for they really have a benign, or at least innocent face, in some species. Other reptiles are grotesque or vicious or expressionless, the face being a mere mask of scale mail, as in the crocodiles. In the birds, modified from the reptilian ancestors from which they are descended in common with contemporaneous reptiles, there is little facial expression, but, as a class, they convey all variations of the emotions through the eyes, which are very eloquent. The nasal structures have considerable development, in some forms, and the extensive jaws are covered with horny sheaths called "the bills," or mandibles, which are varied infinitely to accommodate them to various foods and other purposes.

In the lower Mammals there is not much advancement, in the shape of the face and the structure of the sense-organs, from the reptiles. The outer ear appears, and adds to the expression of the face in various ways. The nasal structures are extended, the mouth widens, and the lips appear. In the Rodents the face is shortened and the lips are elongated. The elephants have considerable elevation of the forehead, which gives them the appearance of the intelligent character which they possess, although this elevation is not brain but air-cells. The other pachyderms have flat and expressionless faces, there often being extravagant elongation and enlargement of the mouth. The horns on the nose of the rhinoceros do not add to his beauty, and the face of the hippopotamus is not to be coveted ! The face of the horse seems much distorted by the great elongation of the oral and nasal structures, but the ears are the most expressive features in this genus. In the Ruminantiæ—especially the deer family—the face is elongated for the accommodation of the extensive nasal sense-organ and the masticating area. Perhaps the sense of taste is more developed in the animals that have larger tongues, for discrimination in regard to foods, but of this we have no knowledge. The eye is large, beautiful, and expressive in this class.

In the Carnivora we find the face shortened below and widened above to accommodate the peculiar jaws, which are short and strong for tearing flesh. In accordance with the habits of the class the face is often cruel and vicious, and becomes ferocious and terrifying when the destructive passions are aroused. We first meet here some expression in the features, for the mouth and lips, eyes and ears, can be made to express affection, fear, defiance, anger, etc., as in the cat and dog.

In the primates we expect to find the closest approach to man, for in the process of collateral development from a common ancestry with them, man has retained many of their peculiarities. We can follow the evolution of the face pretty closely by studying it in this class, from the lowest to the highest forms. In the lowest of the primates, the lemurs, there is little change from the carnivorous mammals. The face is covered with hair, and devoid of expression. The ears are large, but have become more or less motionless ; the eyes are expressive, the nasal and oral parts are reduced, but the face is still that of the mammals. The lower incisors are usually inclined forward, are not vertical, so there is no chin.

Advancing to the monkeys proper, we find a sudden change. The face becomes at once the seat of expression, and even the little marmosets have considerable facial expression. The face is more or less bare, and the features become mobile, the eyebrows and lips being very active. But the nose is ill developed, embryonic, in fact, and is especially deformed in the New World monkeys, in which the nostrils are set wide apart and look outward, not close set and looking downward, as in the Old World monkeys. The upper lip is wide and stiff, the mouth begins to have some expression, but the chin is still absent. The mouth has a characteristic upward curve at the center, and dips downward at the corners,—a quadrumanous characteristic which reappears in many coarse human mouths, as many quadrumanous peculiarities do thus reappear in the face of man. Various parts of the faces of monkeys may be covered with whiskers of various colors, especially the lower part of the face and chin.

The baboons have a long, dog-like face, the nose, mouth, and chin resembling the Canidæ. In some forms, as the drills and mandrills, the face is peculiarly marked by highly-colored skin. The remarkable cheek-pouches, which are used for carrying food,are a characteristic of many of the baboons.

The Anthropomorpha comprise the man-like apes,—the orang-outang, the chimpanzee, and the gorilla, as these, taken together, approach man most nearly in general structure. One species resembles him in one part, and another in a different part. None of them are very close, of course, but it has been often remarked that there is less difference than between the highest apes and the lowest quadrumana, the lemurs. The lowest savage differs from the highest civilized man almost as much as he does from the apes.

In the orang the forehead is full and rounded, and the face less brutal and ferocious than in the gorilla. The head is pointed and high, and the shape of the brain more like that of man than that of any of the other apes. The lips are long, full, projecting, and expressive. Their forms are recalled by the Negroid and Celtic races of man, and perhaps others.

The Troglodytes include the chimpanzee and gorilla. The latter has strong and high supra-orbital ridges, erected for the attachment of enormous muscles, which give him a ferocious and forbidding appearance. These ridges reduce the apparent height of the brain-case also. In the chimpanzee the whole face is more like that of man, the ridges being reduced and the face less brutal than the gorilla. The head is not so pointed as that of the orang, but higher than that of the gorilla. The flat condition of the external nares gives the chimpanzee's face an immature look. In the young the face is almost human, but the supra-orbital ridges and retreating forehead grow and increase with age, bringing out the animality. The ears are more like those of man, and the lips are neither so extensile nor so large as in the gorilla and orang. The face in the apes is bare, brown-skinned, and much wrinkled.

THE ORANG.
(From Wood's Natural History.)

Prof. Mivart (in "Man and Apes") is uncompromisingly opposed to the theory of the descent of man from an ape-like ancestor. He delights especially in debasing the much-vaunted gorilla as the near relative of man, and seeks out resemblances in other primates that bring them just as near, or nearer, to man. But these also prove the position of the evolutionist and the defender of the common origin of man and the quadrumana; for it is the resemblances in the class in general, and not in any one species, that he would look for. Prof. Mivart says, "The gibbons are more human than the orang, the chimpanzee, or gorilla, as to the preponderance of the brain-case over the bony face. But the smaller American monkeys exceed the gibbons in this respect, while the squirrel monkey exceeds man him-

THE CHIMPANZEE.
(From Wood's Natural History.)

self. A striking feature of the human skull is the prominence of the inferior margin of the lower jaw in front,—*i.e.*, the presence of the 'chin.' This feature is quite wanting in even the highest Anthropoidæ. A more or less developed chin exists, however, in some lower forms, as the Siamang, although no other ape or lemur shows a similar condition. Another marked human cranial character is the projection and transverse convexity of the bones of the nose. This convexity is quite absent in the chimpanzee and in most gibbons. In the orang these bones are exceedingly small and flat, often even uniting into one bone or with the adjoining jaw-bones, if indeed they are not altogether absent. In the gorilla they are slightly convex transversely at their upper part, so that here we seem to have evidence of the predominant affinity of the gorilla to man. Further examination, however, shows that this character can have no such meaning, since a still more decided convexity is found to exist in some Semnopitheci and even in the lowest baboons. In the latter the nasal bones only become more convex toward maturity, being at first flat. . . . Now it is not the chimpanzee, certainly not the gorilla, nor yet the gibbons, which most resemble man as regards his brain. In this respect the orang stands highest in rank. The height of the orang's cerebrum in front is greater in proportion than either the chimpanzee or gorilla, while the brain of the latter is below that of the chimpanzee; so that this much-lauded ape is inferior to both the orang and the chimpanzee. The Simian's faith is at fault, and the pretender gorilla must abdicate in favor of two better claimants at least."

Prof. Huxley says ("Man's Place in Nature"), "In the gorilla the face, formed largely by the massive jaw-bones, predominates over the brain-case; in man the proportions of the two are reversed. In man the surface of the skull is smooth and the superciliary ridges or other prominences usually project but little, while in the gorilla vast crests are developed upon the skull and two strong ridges overhang the cavernous orbits like great pent-houses. Sections of skulls show, however, that some of the apparent defects of the gorilla's cranium arise in fact not so much from deficiency of brain-case as from excessive development of parts of the face. The cranial cavity is not ill shaped, and the forehead is not truly flattened or very retreating, its really well-formed curve being simply disguised by the mass of bone which is built up against it. . . . It is the large proportional size of the facial bones and the great projection of the jaws which gives the gorilla's skull its small facial angle and the face its brutal character. . . . The lower apes and monkeys exaggerate the general proportions of the muzzle of the great anthropoid, so that his visage looks mild and human by comparison with theirs. The difference between the gorilla and the baboon is even greater than it appears at first sight, for the great facial mass of the former is largely due to a downward development of the jaws; a certain human character, superadded upon that almost purely forward, essentially brutal, development of the same parts which characterizes the baboon and yet more distinguishes the lemur. . . . The orang's skull is as devoid of excessively developed superciliary prominences as man's, though sometimes exhibiting crests in other places. In some of the cebine apes or others the cranium is as smooth and rounded as that of man himself."

THE GORILLA.
(From Wood's Natural History.)

The truth is that the divergencies are so many and the resemblances so few that none of the Anthropomorpha are really very near to man. Still, the class, taken together, presents many indications of relationship. In the facial form and features there are many such resemblances, evidencing the collateral development as well as the relationship of the face in man and the quadrumana.

The human face, like the remainder of the mere tenement of the soul, came up through many vicissitudes to its present beauty and perfection. As Huxley again says (*op. cit.*), "Our evidences of the nobility of manhood will not be lessened by the knowledge that man is, in substance and structure, one with the brutes; for he alone possesses the marvelous endowment of intelligence and articulate speech, whereby, in the secular period of his existence, he has clearly accumulated and organized the experience which is usually lost in other animals." The face indeed has developed from the highest plane of animal life to that highest plane of human life where we find its perfection, along with the development of that higher intellectual power which dictated its superior formation. The path by which the mutual and simultaneous development of the face and mind was accomplished after the mere brute was left behind, is entirely lost; but we know by the wonderful results that there was such a growth, sometime, somewhere. The face and brain were developed collaterally, and the high perfection of the face in man is due to his high brain-development. It is unfortunate that the paleontological history of man has not been recovered; but when it is found, this, among other important questions, will receive a flood of light. For the present we must be content with studying the evidences of the evolution of the face in the collateral animal branches and in the embryological record.

(To be continued.)

A HISTORICAL VIEW OF PATENTS AND COPYRIGHTS.

BY WALDO E. BOARDMAN, D.M.D., BOSTON, MASS.

THE subject of professional patents has been largely discussed in years past, but having lain dormant for a considerable period is again taken in hand by dentists hoping to settle the question from an ethical point of view.

In the discussion of this question the main point is lost sight of by those who are so eager to uphold professional ethics in condemning all who obtain patents upon inventions while remaining in the practice of their profession, as well as members of dental societies, but absolving those who procure copyrights upon literary productions.

Where lies the consistency in copyrighting literary productions and refraining from patenting inventions is not made quite clear by those gentlemen who so vigorously advocate the one position and condemn the other. Are they honest in desiring protection to ideas in one direction and prohibiting it to those in another?

Among those gentlemen in our profession to-day who object to dental patents, how many are there who have ever brought to light and perfection any real and substantial patentable improvement? On the other hand, how many are there who advocate copyrights to protect their literary productions? The answer is plain enough : they deprecate the patent and uphold the copyright because of selfish motives.

Looking into history, we find all civilized nations in modern times consider it desirable, as a matter of justice as well as of sound policy tending to the advantage of the whole community, to give inventors an exclusive privilege or right to their inventions for a limited period. Of course the inventor is expected to derive some benefit from the monopoly, and the hope of profit or reward we know to be the great stimulus to invention.

An author writes a book, or an artist designs a picture, and the law allows a right of property to them in their productions, and grants with this right the power of repressing infringements. Were it not so, how many would give their time to the writing of books or the creating of works of art? Does not this same principle apply to inventors? and should not the works of their brain have equal protection from piracy? Admitting this to be so, then we agree that a copyright and a patent are practically one and the same.

Whence emanate copyrights and patents? As far as is known, the English were the first to confer power on the king to grant patents, but the power was abused by reason of grants to those who were not entitled or deserving, thus "creating monopolies in the necessaries of life and its conveniences, the right of which had existed in the public from time immemorial." The term "patent" was thus early indiscriminately applied to the rightful privileges by which inventors were rewarded for creating new and valuable improvements which had never belonged to the people, because they had never existed, and to the wrongful monopolists in the sale of articles of food, etc., the right to trade in which had always belonged to the public. The popular mind thus became confused between a patent for an invention, which is right and proper in itself, and a monopoly in previously-known articles of the trade, which is manifestly a violation of common law and of natural justice. The latter class of patents was the inciting cause of the great revolution which swept away the arbitrary and unconstitutional power from the British kings ; but the same enactment, the statute of monopolies, excepted from its operation the patents granted to inventors ; and as the statute did not establish, but confirmed, the practice of encouraging improvements in the useful arts, such practice may be traced back to the time of Edward III, who issued the first recorded patent to "two friars and two aldermen" for an alleged discovery of the "philosopher's stone."

The separation of patents for useful inventions from the wrongful monopolies which crushed the people culminated in Parliament November 20, 1601, in Elizabeth's reign, and ended with the dethronement of the Stuarts. The principles of the common law were defined and made clear in 1623.

Up to 1852, in the absence of a statute on the subject, Scotland issued patents to inventors. We now come to the common-law origin of patents for inventions, which is a matter of great interest in its connection with the like origin of copyrights (which are simply patents under another name and applied to another class of objects) for literary productions, etc.

Some of the earliest recorded English patents were nothing more nor less than copyrights protecting literary property, and some were far less defensible on grounds of public policy or of abstract justice than any patent ever granted for a *bona fide* new and useful invention. Lord Cromwell was granted a patent in 1539 for five years, for the exclusive right to print the English Bible. Torrenti was given a patent for seven years from 1551, for printing the "Pandects and Digests of Justinian," and two years after Tuthille received a patent for printing "all manner of books of the temporal law called the common law."

In 1556 the Stationers' Company, of London, received a charter which was more in the nature of an unjust monopoly than was ever claimed for a new and useful improvement in the arts. Fifty years subsequently they obtained "the exclusive right of printing primers, psalters, psalms, almanacs, and prognostications."

The nominees of Edward, Lord Morly, received a privilege, March 3, 1615, for "the sole printing of a small book entitled 'God and the Kinge,'" and in 1617 the attorney-general issued an injunction to restrain infringements upon a patent granted to the same for the sole printing of a book "On the Oath of Allegiance." This was seventeen years previous to the first patent granted in England, and probably in the world, for a mechanical improvement in the art of printing (that of Arnold Rotsipen, for a printing-engine, dated June 24, 1634). Many other patents of a like nature might be mentioned.

The Long Parliament, in 1649, confirmed a provision (passed by both houses in 1644 to the Stationers' Company) which made copyrights as much a creation of statute as the act of 21 James I had made patents for inventions a creation of statute, both having a common-law origin, both being subsequently recognized, defined, and controlled by legislation. John Day Grant, November 1, 1634, was granted protection "for the sole printing of the weekly bills of the prices of all foreign commodities for the term of fourteen years," which well illustrates the identity at that time existing between patents for inventions and copyrights for literary productions. An even clearer case of copyright was embraced in the patent for twenty-one years to Wm. Braithwaite, August 18, 1635, for the sole printing and sale of his books containing an easy method "of teaching devised by him," he being a reader and schoolmaster.

An act passed by Parliament provided that after April 10, 1710, "the authors of books already printed who have not transferred their rights, and the booksellers, etc., who have purchased copies, to have the sole right of printing them for twenty-one years. The authors of books not printed to have the same for fourteen years. . . . After fourteen years the right of printing, etc., to return to the author, if living, for other fourteen years."

This was virtually the then existing patent act applied to books, except that the places of registry were different, and the terms of a patent for an invention and for a copyright on a book were, by virtue of reversion, twice as long in the latter case as in the former. The only material difference in the previous status of patents for inventions and for copyrights had been, in fact, that in the one there was no specified limit; in the other the term had been set by the act of 21 James I at fourteen years.

At the present time the identity between a patent commonly so termed and a "copyright" is illustrated by the fact that an individual design that in England and Canada is secured by copyright, in the United States is protected by "patent." To further support the point that patents and copyrights were from the outset considered identical in character, we find in the eighth section of the United States Constitution the following paragraph: "Congress shall have power . . . to promote the progress of science and the useful arts by securing for limited times to *authors and inventors* the exclusive right to their respective *writings and discoveries*."

In 1842 a United States statute provided that patents might be issued for seven years on designs and on "busts, statues, or bas-reliefs or compositions in alto- or bas-relievo," and any new or useful "pattern, print, or picture." Recent legislation has placed individual designs within the protection of the Patent Office, and other items than those above indicated under protection of copyright. But, as one writer has said, the language of this act shows what has been the case from the first,—that, in all essentials, patents and copyrights are the same in principle, rest upon the same basis, and no distinguishing line can be drawn between them.

I have freely quoted history to show that patents for inventions and discoveries and copyrights for literary works had a common origin; they rest upon the same basis, and must stand or fall together.

If an international copyright law to prevent piracy from abroad is right, then a law to prevent stealing of inventions is right. Says Oliver Wendell Holmes, "I cannot see that a callus on the palm confers any better claim to fair treatment than a furrow in the forehead and an aching in the brain."

James Russell Lowell, in a recent letter upon the subject of international copyright, says that "the adversary has cunningly intrenched himself in the argument that there can be no such thing as property in an idea, and I grant that this is a fallacy of which it is hard to disabuse the minds of otherwise intelligent men. But it is in the form given to an idea by a man of genius, and in this only, that we assert a right of property to have been created. The founders of our republic tacitly admitted this right when they classed the law of copyright with that of patents. I have known very honest men who denied the public expediency of such a right in both cases, but I cannot understand either the logic or the probity of those who admit the one and deny the other. This right is visible and palpable in a machine, invisible and impalpable in a book, and for this reason the law should be more assiduous to protect it in the latter case as being the weaker. But after all, every species of property is the artificial creature of law, and the true question is whether if such property in books did not exist it would be wise in our own interest to create it. The inventions of Whiting, of Fulton, and of Morse added enormously to the wealth of the nation. Have not those of Edwards, and Irving, and Cooper, and Emerson, and Hawthorne, and Longfellow . . . added also to that wealth, and in a nobler kind?"

Wherever patent laws have been fairly tried they have produced but one result, the quickening of industries, the creation of wealth, the cheapening of all the necessaries of life, the bringing of luxuries within the reach of the poor, the diffusion of knowledge, the rapid but normal growth of every element of national prosperity or individual good.

Consistency would seem to demand that all should accord to the inventor that degree of consideration which is now and has been hitherto demanded for the author.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

THE thirtieth annual meeting of the American Dental Association was held at Excelsior Springs, Mo., commencing Tuesday, August 5, 1890. The sessions were held in Music Hall. The meeting may be reckoned one of the most successful in the history of the association, whether as regarded from the point of attendance or the quality of the papers read. Nearly or quite three hundred practitioners of dentistry were present. The weather was all that could be desired, the surroundings delightful, insuring the material comfort of those in attendance. That the members enjoyed their opportunities is best told by the following resolution, which was adopted without a dissenting voice :

Resolved, That in selecting Excelsior Springs, Mo., as the place of holding our thirtieth annual meeting, this association has been particularly fortunate. Whether we regard the beauties of the surroundings, the variety of its health-giving waters, the excellence of the hotel, or the courteous, liberal, accommodating spirit of the company's management, we can specially recommend Excelsior Springs, Mo., as a desirable place for holding literary and scientific conventions, and as possessing unusual advantages as a health and pleasure resort.

FIRST DAY—*Morning Session.*

The association was called to order at 11 o'clock. President M. Whilldin Foster, Baltimore, in the chair.

The secretary read the *ad interim* minutes relating to the taking of a vote upon a change in the time and place of the meeting, at which one vote was cast in the affirmative. Ordered to stand approved.

A committee from the Southern Dental Association, consisting of L. D. Carpenter, Atlanta, Ga. ; J. Y. Crawford, Nashville, Tenn. ; J. Taft, Cincinnati, O. ; C. S. Stockton, Newark, N. J., and W. J. Barton, Paris, Tex., presented the following resolution adopted by that association :

WHEREAS, There is to be a World's Columbian Exposition in Chicago in 1893 ; and whereas, in consequence of the fact that the choicest products of the world are to be there displayed, it is expected that citizens in large numbers of all civilized countries will be gathered together there for the purpose of seeing these exhibits ; and whereas, it is to be presumed that many dentists from foreign countries will visit the United States at that time ; and whereas, the time of the exposition will be an opportune occasion for a great meeting of dentists of the world ; and whereas, it is believed that a great advance in the science and practice of dental and oral surgery would result from a meeting of the dentists of the United States with those from foreign countries who might then be visiting this country ; and whereas, it is desirable that any meeting then held should be at the instance of the American Dental Association and the Southern Dental Association, and organized by a joint committee by them appointed ; therefore, be it

Resolved, That the president of this association appoint a committee of five, to confer with a like committee that may be appointed at the next meeting of the American Dental Association upon this subject, and that this joint committee have power to fill all vacancies, and shall add to its membership either one, three, or five more members as it may deem advisable ; and when this committee is so completed it shall be clothed with full power to take such action as it in its judgment may deem best for creating an organization for the purpose of holding a dental meeting in Chicago in 1893, which the reputable dentists throughout the world shall be invited to attend, and that any action that this committee may take in the premises shall be final and binding.

Dr. F. H. Gardiner, Chicago, withdrew a similar resolution, which he had previously offered, and moved concurrence in the action of the Southern Dental Association, and that the president appoint the committee suggested. So ordered. The president subsequently appointed the following as members of the committee on the part of the American Dental Association: Drs. L. D. Shepard, Boston, Mass.; W. W. Walker, New York; A. O. Hunt, Iowa City, Ia.; H. B. Noble, Washington, D. C.; Geo. W. McElhaney, Columbus, Ga. At a later session it was announced that the joint committee had held a meeting and appointed the additional members provided for, making the complete committee as follows: W. W. Walker, New York; L. D. Shepard, Boston, Mass.; A. O. Hunt, Iowa City, Ia.; H. B. Noble, Washington, D. C.; Geo. W. McElhaney, Columbus, Ga.; L. D. Carpenter, Atlanta, Ga.; J. Y. Crawford, Nashville, Tenn.; J. Taft, Cincinnati, O.; C. S. Stockton, Newark, N. J.; W. J. Barton, Paris, Tex.; John C. Storey, Dallas, Tex.; M. Whilldin Foster, Baltimore, Md.; A. W. Harlan, Chicago, Ill.; John S. Marshall, Chicago, Ill.; H. J. McKellops, St. Louis, Mo.

A communication from The S. S. White Dental Manufacturing Company was then read by the secretary:

TO THE PRESIDENT AND MEMBERS OF THE AMERICAN DENTAL ASSOCIATION:

Gentlemen,—We solicit your thoughtful attention to and formal action upon the following statement of facts.

At the last meeting of your body Dr. Louis Jack read a paper entitled "The Necessity for Independent Dental Journalism." In the discussion which followed the reading of that paper, Dr. W. C. Barrett is officially reported as having said that the American Dental Association "slams the door in the faces of all its journals, and refuses to allow them access to the sources of information," and "deliberately closes up the legitimate channels through which such information must flow." He stigmatized the arrangement under which the Transactions of the association have been published as "dirty work," done "by the politicians of the society," and averred that "as long as the society clings to its present position it is unworthy to consider the subject of dental literature."

In so far as these charges relate to your association and its attitude and action, we have nothing to say; but, as it takes two parties to make a "dirty" contract, we are naturally averse to resting quietly under such an imputation.

Permit us therefore to rehearse briefly the facts which led to the contract between your association and the company charged as guilty with yourselves of "dirty work."

At the meeting of your association held in Boston in 1880, the Publication Committee reported as follows:

"The Committee wish to state that the Transactions might have been ready for distribution in ninety days from the date of adjournment, had they felt at liberty to proceed at once with the work; but the treasury was empty, and it was not deemed justifiable to commence printing until enough money was collected to insure the payment of the bills. So soon as the proper amount was secured, they proceeded with all the expedition possible, compatible with the proper execution of their task."

As a result of this report of the condition of the treasury, the following resolution was subsequently offered by Drs. Atkinson and Crouse:

"*Resolved*, That the Publication Committee be instructed to confer with publishers to secure the best terms for the publication of the Transactions of this body, with authority to give such portions of the matter as the publishers may wish, as a part or as a full compensation, and that the Publication Committee have discretionary power to accept or reject any or all offers."

Having been solicited to name the terms on which we would publish the Transactions, a proposition was submitted by us as follows:

[Here follows a copy of the proposition made by the Trustees of Samuel S. White (now The S. S. White Dental Manufacturing Co.), whereby they agreed to supply the association with one copy of the Transactions for 1880 for each member, and one hundred additional copies without charge; printing and paper not to be inferior to those of the published Transactions for 1879. This proposition, the details of which it is not necessary to recite here, was accepted, and at the next meeting of the association, held in New York in 1881, the Publication Committee made a report (which is cited in full) in which the following language occurs: "Of the character of the work done by the Trustees of S. S. White the volume speaks for itself; but the association cannot know how much it owes to these gentlemen. . . . Without the very intelligent and diligent services they rendered you could not have had so fine an edition of Transactions, while your editor and publishers were so widely separated. The committee feel that the warm thanks of the association are due to the gentlemen above named for the valuable services they have rendered."]

The sole object in undertaking the publication of the Transactions by us was to help the association out of its financial straits; and we asked and received no concession which was not granted to all dental journals. The association reserved all rights to its papers, and no journal was permitted to publish any paper in full previous to the issue of its Transactions. For two years the Transactions were published under this arrangement; then a single modification was made in the terms by which the DENTAL COSMOS was permitted to publish in advance such papers as it might elect to print in full. And since the only advantage which it has held over any other journal was the opportunity to publish a paper in full before the appearance of the Transactions. Every journal has always had the privilege of sending its reporter and of publishing reports of the papers and discussions, the papers being furnished by the secretary for reasonable abstracts, with the single condition that they were not to be printed in full. After publication of the Transactions they were, of course, free to all.

This single, simple advantage—permission of first publication—has cost us thousands of dollars; the actual expense of publishing the Proceedings of one year being over seven hundred dollars.

This contract has been faithfully carried out on our part. We have illustrated at large outlay all papers requiring illustration, and have given our best efforts to place the official reports of your Transactions in the hands of your secretary at the earliest time possible after the receipt of the material. Nor have we attempted, directly or indirectly, to control the policy of the association, nor to interfere in any way whatever with its affairs. We have, moreover, given a wider circulation through the DENTAL COSMOS to the proceedings of the society than could have been obtained through any other channel.

We have labored under the impression that we were unselfishly and generously serving the association, and thereby advancing the interests of the profession at large ; but if our business relations with your body are to be openly stigmatized without disavowal as a "dirty" arrangement, the sooner such relations are discontinued the better ; and we hope that some other method of publication will be found which will be more creditable and more advantageous to all concerned. Yours respectfully,

THE S. S. WHITE DENTAL MFG. CO.,
J. W. WHITE, *President.*

Dr. H. A. Smith, Cincinnati, offered the following resolution :

Resolved, That this association accepts as historically correct the statements made by The S. S. White Dental Manufacturing Company concerning the publication of our Proceedings, and disclaims any sympathy with the charges of partiality or unfairness on our part, or of cause of complaint in this connection against the house referred to, whose arrangement with us for the publication of our Transactions we have considered and do still consider to have been generous on its part and of great advantage to this association.

The resolution was referred to a committee consisting of Drs. W. X. Sudduth, H. A. Smith, and George H. Cushing, to verify the facts referred to, and was adopted at a later session.

The president, calling Vice-President Harlan to the chair, proceeded to read his annual address, in which he very clearly stated the object of the meeting to be "for the purpose of correcting past errors, for accepting or rejecting new theories presented, for the dissemination of knowledge for the benefit of our profession, the public, and ourselves." The first subject presented for consideration was the formulation of a plan to make State dental laws uniform, a subject in which the rights and best interests of the public, the profession, the colleges, and the newly graduated student were all involved. In pursuing the theme, the speaker divided the present State laws into four classes : (1) those which demand that both graduates and non-graduates shall be examined by State boards before admission to practice ; (2) those recognizing the diplomas of reputable colleges ; (3) those demanding examinations, but allowing this favor to graduates only ; (4) those demanding examinations of all dentists, whether graduates or not, with exceptional clauses in favor of the medical degree.

The first of these would appear at first glance without serious objection : it seems fair to judge an applicant by what he knows. But is it fair to the college man or to the colleges? Would not the average man prefer to prepare himself at home and save the expense of the college training, as in the end he would have to be examined by the State board? Again, does not this enforced examination of college graduates show to the whole world an implied distrust and want of confidence in the schools, and is it not calculated in every way to injure our institutions?

The second class evidently regard the college training as imperatively necessary, and do not even suppose it possible that practitioners can be qualified in the office of a preceptor.

The laws which demand examinations of all graduates but exclude others from the privilege aid and encourage the colleges in that they concede that the graduate alone is competent to practice, but they throw a wet blanket on them by publishing to the world that there is not a single college in the United States, like Cæsar's wife, above suspicion. It does seem proper that a student who has earned his degree should be exempted from further examinations. But under these laws there is no respite for him. If he, for any reason, emigrates to another State from that in which he has passed an examination, the same ordeal of torture is inflicted. The speaker understood perfectly that the answer to this would be that unless the college graduates were tested by some such examinations the colleges would be under no restraint and might make improper graduations, and he admitted that there was reason in it. But was a State board any more immaculate in its decisions, any less human, or more competent than the faculties?

The intelligence of this association ought to be able to formulate a plan which will insure to the public, to the profession, and to the colleges and their graduates justice and reasonable satisfaction, so that it can be announced to the world that the colleges deserve the confidence of all. Suppose the State board in each State where dental colleges exist were required, conjointly with the respective faculties, to examine thoroughly all candidates for graduation, both theoretically and practically, and their president or secretary to sign with the faculty the diplomas of all such as passed, it would seem that such a diploma might be accepted in every State. The public and the profession should be satisfied, and the colleges would rejoice at being relieved of the unpleasant duty of turning down incompetent men. The students would be fairly and thoroughly examined, and ought to be satisfied, as the examination would be the final test. It would be well, if this suggestion were carried out, that members of the State examining boards be chosen from the ranks of the profession outside of the college faculties.

If this association would properly consider these questions, aided as it no doubt would be by the National Association of Dental Examiners, there would be in time uniform, acceptable, and proper laws on the subject.

The address next suggested the importance of memorializing Congress at this time for the appointment of dentists to the army and navy, dwelling especially on the inhumanity of sending men off on a long cruise under a surgeon whose knowledge of dentistry is limited to the extraction of teeth, and with no one at hand capable of applying an interdental splint in case of a fractured jaw. Of course, in this and in the effort to procure uniform legislation, the aid of the Southern Dental Association and of all State societies should be invited.

The next suggestion was the propriety of indorsing and recommending to the proper authorities the use of models made from impressions of the mouth as a very reliable means for the identification of criminals, citing a number of cases in support of the idea. The models might also furnish a valuable source of study to the ethnologist and physiognomist.

The president would also earnestly recommend the establishment of a head-quarters for this association in the form of a dental museum and library, at the capital of the country. There the archives of the association could be kept safely, and such a museum and library would grow rapidly. By the election or appointment of one of the members resident in Washington there would always be at head-quarters a permanent officer, who would not only take care of and arrange the museum and library, but who would represent us to foreigners, so that anyone desiring to correspond with this body would always know where and to whom to address his communication. The government, properly approached, would willingly aid, probably furnishing apartments in the Smithsonian Institution. The medical department could give great assistance, and would offer great advantages in the study of ethnology and microscopy. Such an enterprise, energetically carried out, would do much to aid in having dentistry recognized by appointments to the army and navy, and would also serve to convince congressmen that there was more in dentistry than perhaps they had dreamed of. So many possibilities depended upon this movement that the speaker would advise the appointment of a committee to examine into its probable value and success, and if favorably considered to report a plan next year for carrying it into effect.

Passing to a consideration of the question of preparatory dental education, the address took the ground that dental education commenced when the student began the study of dentistry, whether in the office of a preceptor or in a reputable school. The previous general education either qualified him for this or it did not. Was it not after all a question of qualification, whether one year, or five years, or original capacity?

The thirtieth annual meeting of this association gave renewed assurance that it will be, as in the past, watchful to guard with jealous care the best interests of the public and the profession. "Many bright lights have been called from labor to reward. They have left with us their spirit and their record ; let us emulate their example and demand from ourselves such earnest work and dignity of character as will command from an intelligent public that further recognition which our profession so justly merits."

On motion, the address was referred to the Committee on Voluntary Essays to apportion it to the different sections interested.

Adjourned to 7.30 P.M.

Evening Session.

The association met pursuant to adjournment. President Foster in the chair.

The sections were then called for reports, without response, until Section II, Dental Education, Literature, and Nomenclature, was reached. Dr. C. N. Peirce, chairman, made a partial report, announcing the papers which had been passed upon by the section.

Dr. W. H. Atkinson, New York, read a paper entitled "Education, Nomenclature, and Terminology," of which an abstract follows :

While admitting the potency of memorized trends of thought, the paper advocated the necessity of keeping in touch with the present luminosity, enforcing the idea that it is much more difficult to unlearn earnestly adopted doctrines than to accept even difficult problems of new presentment contradictory to and demonstrative of the falsity of the claim of finality involved in dogmatic statement. If we are to have the coming times distinctly in advance upon the already effete teachings, we must awake to something better than long didactic preachments. The way to do this is for each to esteem his life-work as a mission for the good of all ; and, being governed by the opportunities of time, to demonstrate anything we may suppose to be an advance, and thus bring it to settlement and formulation.

Dr. A. H. Thompson, Topeka, Kan., then read a paper entitled "Scientific Instruction in our Colleges." The following is an abstract :

Scientific education—*i.e.* pure science and scientific methods—is in great danger in our colleges. The practical man is abroad, and makes his influence felt by instilling even there a contempt for learning and pure science into the minds of students, who care only for the mere certificate of an education and the learning of the mere methods of performing operations, that they may hasten on to money-making. The so-called practical man looks upon science as the pastime of cranks or the amusement of the curious, and condemns it as wasteful of the student's time and money. He would make our college instruction more clinical and industrial.

The plea of this paper is for the preservation and extension of the purely scientific part of our curriculum, and for the nurture of scientific culture, that the student may be more of a thinking man and less of an operating machine. We would that he should have the strength and joy that come from culture and enthusiasm ; that he would love science for its own sake, and that he would give the first place in his mind to the great principles in their scientific purity. We would that he would love learning for its own sake, and not for the mere power of money-getting it may confer. It is this debasing estimate of knowledge that is crushing the higher life out of our people, and it is against this that we enter protest. We would that our science should be upheld because it is science, and because it is ennobling and elevating and is the basis of all knowledge and practice.

It is true that in spite of all opposition science has steadily advanced and carried forward our professional education. But it is true also that the practical idea is still strong and drags upon the wheels of progress. The worst of it is that there are few minds in this materialistic age that can grasp any other than the money estimate of life, and we cannot wonder that our young people are polluted by this influence, or that they grow up to care for nothing but money. A few have escaped this slavery, and know the joy there is in higher things : they know that the things of real worth, the culture which lifts men and ennobles their souls, are not earthy, and are not to be estimated at a money value. Pure science, abstract science, theoretical science, if you will, should be cultivated in our schools for its ennobling influence.

We would not detract from the value of practical teaching. Its importance is so great that it could not be ignored if we would. We would not be ungracious to the memory of the Varneys and Webbs who have gone before, nor to the host of the living artistic operators who by their skill have raised the standard of operative dentistry. On the contrary, we glory in the honor which they reflect upon the profession. These are nature's noblemen. We should attain the highest artistic perfection possible, but it is not necessary to the success of the artistic branch of our profession that the scientific should be sacrificed. Without advanced science we cannot have advanced practice.

If it were true that practical education was the main thing, as the practical man would have us believe, it were better to return to the old office apprentice system. No time was wasted on theory or science in that system, and the student had no end of practical experience. But the college system of our day is the embodied protest of the profession against the old office system. It originated in response to a demand for a higher education, and its main feature is to teach young men the science of the profession. We must not lose sight of the main fact, that scientific knowledge of the underlying principles is the main, the primary structure, the foundation ; the superstructure of practice is built upon and depends on it, and is secondary. The primary principles are permanent and immovable ; the superstructure of practice is variable and transitory. Practice changes from year to year, but science is stable and changeless. Is it not essential, then, that the student should be well grounded in the great principles?

Then, again, practice is science applied and materialized. Without knowledge of the qualities of things we could not have accomplished what we have in practice. Therefore science is a practical thing. Modern civilization is the product of science : it is thought materialized. The civilized man has conquered most of nature and made it more tributary to his wants. The accumulated knowledge of the centuries is his storehouse. The savage man thinks but little and can do but little. He is not hampered by science nor by the effort or products of thought. He acts by force. The civilized man acts and lives by thought, and by it subdues the forces of nature and makes them serve him. It is folly to ignore the products of thought in our teaching.

It is apparent to all that we are entering upon a new era in dental education, and in the impending revolution the friends of science must be vigilant that its pursuit is not molested in the iconoclastic wave of practicalism that is sweeping over us. To that end one of the first considerations is that of methods of study. The three years' course will necessitate a graded course, which is scientific, and will be productive of good results. The first year's course will be largely class-room work, and catechetical in its methods. It will be a sort of primary work. The next year should be a combination of class-room work and didactic lectures, and the third year will be entirely didactic. The watchword should be, simplification in the first year, precision in the second year, and amplification in the third year. But it is a question whether colleges will conserve the scientific branches, or develop the practical at the expense of the former.

A crying need of the times is better text-books, and for the graded course they will become a necessity. The present ones are clumsy, padded with obsolete and useless matter, do not keep pace with scientific progress, and are totally unfitted for the purposes of the student. We need graded monographs on all branches or parts of branches : for the first year plain and elementary, for the second year careful and exact, and for the third year broad, deep, and comprehensive. We need also better teachers,—men trained for the work. Very few practitioners are capable of teaching ; and we need men peculiarly fitted for the work, who can be given the leisure, by proper compensation, to devote themselves to it.

The requirements for admission should include not only a good general education, but also some elementary knowledge, at least, of chemistry, physics, anatomy, and physiology, that the teacher's time need not be taken up in instructing the students in the beginnings of these sciences, as is now the case. Manual training should be made a part of the dental student's education ; but, as has been well said, it is the preparatory school, and not the college, that should train the student in manual manipulations, artistic principles, knowledge of materials and the working of them. Manual training should not be carried on at the expense of scientific culture and intellectual development.

A curious feature of dental education that has appeared recently is the matter of the examination of graduates of colleges by State boards before being admitted to practice. The immediate result of this movement appears to be a conflict between the boards and the colleges, in which the latter are likely to get the worst of it. The State boards of examiners will, if such legislation continues, dictate the dental education of the future. Where they lead the colleges will be bound to follow, and that education will be largely practical. The board will be made up of men from the ranks of practicing dentists, who are practical men by necessity, and there is danger of their encouraging a practical education to the exclusion of the scientific branches. To do this would be to retrograde and debase our education. The boards are vested with supreme power and can dictate the education of the future, for with them rest the standards. This is a great responsibility, and let them look to it that they are worthy of the trust.

The thoroughly qualified man in any profession, whether physician or lawyer or theologian, is the one who by study and training has become well educated and learned in the fundamental principles of his profession, so that he can approach practice from this strong vantage ground. The weak man is the one who is superficially educated in the great principles of his calling and is a self-confessed empiric. Empiricism will no longer answer the demands of an intelligent age. Practice must rest, not upon experiment, but upon science. A professional education is presumably a scientific education. We claim to be a profession ; therefore let our education be scientific that we may justify the claim. Let us guard the scientific branches as the vital part of our education, to lose which would be to lose all.

(To be continued.)

The following officers were elected for the ensuing year : A. W. Harlan, Chicago, president ; J. D. Patterson, Kansas City, Mo., first vice-president; H. B. Noble, Washington, D. C., second vice-president; Geo. H. Cushing, Chicago, recording secretary; Fred. A. Levy, Orange, N. J., corresponding secretary; A. H. Fuller, St. Louis, Mo., treasurer; C. N. Peirce, Philadelphia, H. A. Smith, Cincinnati, and L. D. Shepard, Boston, executive committee.

The selection of the next place of meeting was left in the hands of the committee of arrangements.

SOUTHERN DENTAL ASSOCIATION.

THE twenty-second annual meeting of the Southern Dental Association was held in Atlanta, Ga., beginning Tuesday, July 15, and continuing four days.

FIRST DAY—*Morning Session.*

The meeting was called to order at 10.30. President J. C. Storey in the chair. Prayer was offered by Rev. Dr. Hawthorne. Dr. Wm. Crenshaw introduced Hon. John T. Glenn, mayor of Atlanta, who extended the hospitality of the city to the members of the association.

Dr. J. B. Patrick, of Charleston, S. C., responded on behalf of the non-resident members.

The president then delivered his annual address, in the course of which he stated that the records of the Southern Dental Association and the papers read before it had never been published, and suggested that a committee should be appointed to consider the advisability of collecting and publishing the papers and minutes of the different meetings. He also discussed the recent move in dental educational institutions extending the time of study. He thought the principle was wrong; the diploma should be given when the student was able to pass the examination, whether he had attended one term or a dozen, and should not be given before he could pass such an examination. The three years' course was laying additional and unnecessary burdens upon the poorer students, and was not just to them, while a diploma granted upon examination would be strictly just to every one. The diploma so granted should be the only qualification necessary to qualify a student to become a legal practitioner of dentistry. He did not think that State examining boards should have the right to require the holder of a diploma from a reputable dental college to appear before them for an examination. Regarding the proposed international dental meeting to be held in Chicago at the time of the exposition of 1893, he thought it was right such a meeting should be held at that time, and that it should be a separate organization of American dentists; that all foreign dentists should be invited to attend as our guests, and that the Southern Dental Association and the American Dental Association should appoint a joint committee to arrange for this meeting. He hoped that a resolution would be offered to that effect during this session.

In conclusion, the president alluded to the death of Dr. Homer Judd and Dr. W. D. Dunlap, deploring the loss of those valuable members of the association, and recommending that a committee be appointed to draft suitable resolutions.

In pursuance of a recommendation of the president, a committee was appointed to whom all resolutions should be referred without debate.

Afternoon Session.

Dr. C. S. Stockton in the chair. He mentioned the several topics suggested in the president's address, and requested that the discussion should be confined to one subject at a time, the first being the recommendation as to the printing of the proceedings of previous sessions.

Dr. J. B. Patrick moved that a committee be appointed by the president to take into consideration the advisability of gathering the records of the society and putting them in book form. Motion carried.

The next topic was that concerning dental education, dental laws, and dental examining boards.

Dr. Patrick said that the boards in most, if not all, of the States were composed of men selected by the dental society of the State. These examining boards were a boon to poor young men who were not able to leave home and spend the time necessary to get diplomas from a college, but who could by application to study under a preceptor fit themselves for practice; then by passing the examining board they were enabled to commence their professional life.

Dr. G. F. S. Wright did not think that the diploma of a college should be final, but that the possessor of such diploma should be required to pass the examining board. He asserted that the examining boards were raising the standards of the colleges. When the students of one college succeed in passing the examination of the State board with credit and those of another college fail to pass the same examination, the effect will be that students will join the one whose graduates pass, and the one whose graduates fail will be in disrepute, and will have to increase the efficiency of their instruction or be crowded out of existence.

Dr. W. H. Atkinson said he was opposed to diplomas from beginning to end, for they set out that the recipient of the degree was what no man can be. He advised simply a certificate of the amount of advancement attained.

Dr. J. B. Coyle said that law was supposed to be the perfection of common sense. In unorganized communities there is no law but the law of personal liberty. In organized communities, on the other hand, each individual surrenders part of his personal liberty for the benefit of all. Dental laws are of this character. They are for the benefit of all ; the law defines who shall practice such professions as medicine, dentistry, and law. The state of the profession of dentistry was such that it needed heroic treatment. Some of the colleges were graduating men without qualification for practice. He knows of men taken from the cornfield in October returning to Georgia and South Carolina as dentists in April. The examining boards have made this impossible ; they have done more to elevate the curriculum of the dental colleges than all other influences combined. We all know that it takes a certain time limit to effect the education of a man for a profession, and we must insist, if we are to be thorough, upon the time. An industrious, intelligent student may fit himself to pass an examination in a comparatively short time, but not to practice. The tendency of European professional schools is to make experts in science ; of the American schools it is to make only experimenters. It is true that some of these after years of study and failure succeed in educating themselves creditably, but it would have been both better and cheaper for them to have been taught in college by competent teachers what they have had to learn by unaided study and unguided experiment.

Dr. Genese spoke of the longer term of study required before entering professional life in Europe, and said that State examining boards would be necessary until we insisted upon more thorough preliminary training.

Dr. Gillson thought the examining boards were doing good service.

Dr. B. H. Catching thought the examining boards had done a vast amount of good, and it was because of them that the colleges had raised the standard of their examinations. He could not see that any harm could come from the requirements of the boards.

Dr. H. E. Beach said that State boards were not enough. There should be a national board, and then all students would be on an equality. When a candidate could pass the examination of that board, he should be allowed to practice without regard to the length of time he had passed in study.

Dr. J. J. R. Patrick thought that it was right that the diploma of a college should entitle the holder of it only to an examination to determine whether he is or is not qualified to practice. Each State should protect itself against the spurious colleges of other States by examining the graduates whom they send out to find whether they are fit to practice on her own people.

Dr. Crawford said that as some one must be trusted in this matter, he thought that those with the experience of teachers in dental schools were better able to judge of the competency of a candidate than any others. It was an unjust reflection on them to say that they are not to be trusted. In the discussion of this subject we are apt to lose sight of the moral effect of the law to regulate practice. Its mere existence influences those who wish to practice toward a better preparation. There should be such laws, but when a man has passed through a legally instituted institution he should be allowed to practice without any other examination than that of his diploma.

Dr. R. Ottolengui agreed with the president that knowledge and not time should be the standard for admission to the profession. The colleges have done much for the profession and will do more, and we should not antagonize them. There are four classes interested in this question,—patients, students, dentists, and the colleges. These all have different interests, and any change should be made in the interest of all. If we can make it to the interest of the college to improve its standard, it will do so. He suggested a national board of twenty men from twenty different States who should formulate the questions to be used in examination, and all candidates should have the same questions and be required to attain the same average of correctness. Each college, then, and each teacher would feel that if the rank of his college was to be maintained its students must be prepared to pass successfully the test of this examination.

Subject passed, and the suggestions concerning the international meeting at Chicago were taken up.

Dr. Storey said it was likely that this subject had not received much thought by the members, but it was time that we should give it thought and make preparation for action. There is a proposition to continue the International Dental Congress. He thought that would break up the dental sections in the American Medical Association and in the International Medical Congress. There will be an effort to hold a "memorial" meeting of the American Dental Association, and we want to meet that association half-way and arrange in connection with it for a grand convocation of dentists in Chicago, and to invite dentists from foreign countries to be our guests. To effect this organization this association might appoint a committee of five and the American Dental Association a like number; these ten to add say one, three, or five more, constituting a committee of organization.

Dr. L. D. Carpenter offered a resolution providing for the appointment of such a committee.* On motion, the resolution was adopted.

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* The resolution and the names of the committee were published in the Dental Cosmos for August, page 666.

Evening Session.

President Storey in the chair.

Dr. Stubblefield read a paper contributed by Dr. Morgan Adams, of Sardis, Miss., upon "The Preparation of Cavities."

He classified dental cavities, and detailed the proper modes and means for suitably preparing them to receive fillings. He finally summarized the points of the processes as follows, premising that he employed the Perry separators for gaining free access to approximal cavities and used cohesive gold :

1. Enlarge, shape, and cleanse the cavities with sharp chisels, excavators, and engine-burs.
2. Remove as much carious substance as is consistent with the safety of the pulp.
3. Cut away the thin edges of enamel and leave no acute angles.
4. Open their approximal cavities from the grinding-surfaces of molars and bicuspids as a rule.
5. Make anchorages in the cutting-edges of incisors where the enamel plates come together, or where they have been chemically or mechanically abraded.
6. Smooth and polish the edges of all cavities.

Discussion.

Dr. Staples said that his method of preparation of a cavity between a molar and a bicuspid was similar to that described by the essayist. Many practitioners so prepare such cavities that they put in a smaller filling than he did,—they cut away less than he did ; but what he cut away was none too much, in his opinion. Some dentists are afraid to use too much gold or are too indolent to take the time to put in a large gold filling, so they fail to clean out the cavity as they should, and then when the filling fails they charge it to bacteria. They should cut away the decay more thoroughly, cut clear to the sound tooth-substance, and then they will have fewer failures.

Dr. Genese asked the essayist whether his preparation of a cavity for filling consisted only in the preparation of the walls. What does he do in cases of hypersensitive dentine, or where there is discolored dentine ?

Dr. Adams said that he would leave disintegrated dentine in the cavity rather than risk too close an approach to the pulp, as such dentine when closely sealed up would recover its hardness to some extent, and the decay would not extend under a good filling.

Dr. Teague said in excavating the cavities it will not do to get the walls so thin that the exposed edges will crack and afford a place for bacteria to find a lodgment. All approximal fillings should be so formed that the bulge of the fillings will be in contact and not the dentine. No frail wall of enamel should be left as the wall of a cavity, as it will be sure to crack, and decay will recur. Care should also be taken not to leave the edges of a cavity too thin, especially at the cervical border. With a gold filling the gold can be worked over the edge of the enamel, and this protects it, but with an amalgam filling the edge is very apt to crack from the force of mastication, and the filling will be lost by decay at this border.

Dr. Barton said that reference had been made to cavities in which the carious dentine was to be removed as far as the safety of the pulp would permit, and to cases of sensitive dentine. He thought in such cases the best method was to fill with a temporary filling of cement. The sensitive and partially decomposed dentine will become hard and flinty in the course of two or three weeks, and the tooth may be filled with cohesive gold. In some cases, where the cavity extends very near the pulp, it is advisable to leave part of the cement under the gold.

Dr. R. C. Young said in case any of the carious dentine was left in the cavity it should be thoroughly sterilized.

Dr. H. H. Johnson said that it was not good practice to have a groove at the cervical margin to retain the filling, as the groove cuts the connection between that portion of the edge and the pulp and thus cuts off the nutrition from the dentine at the edge of the cavity, and in consequence it crumbles away and the filling is destroyed. Retaining-pits are much better to hold the filling.

Dr. H. E. Beach said that he did not believe in retaining-pits in any part of a cavity, nor in deep grooves either. The cavity should be formed so as to make a double dovetail, and the filling will be held securely without retaining-pits or grooves. A great many fillings are lost because of too much impaction of gold about the margins; it causes a disintegration of the dentine.

Dr. Atkinson said a very little undercut is all that is needed in the hands of anyone at all fit to fill a tooth. It is necessary to remember, if in the building up of the filling it rocks ever so little, it is necessary to take it all out and begin again. He much prefers not to remove all of the melted dentine and risk the exposure of the pulp. He said melted rather than decalcified or disintegrated, because it is not decalcified; as the lime-salts have not been taken away, they are still *in situ*, and if shut up will grow hard and flinty, as we all know who have had to remove a cement filling. He always wiped out the cavity with wood creasote and oil of cloves.

Dr. J. J. R. Patrick said the way to finish a gold filling so it would be perfectly secure was to burnish the gold neatly and carefully over the edges of the cavity. Finish between the teeth with a very fine draw-file, and burnish it afterward. The enamel on the approximal surfaces of bicuspids and molars is very thin, especially on the anterior and posterior surfaces of the superior bicuspid, and it is better, if there is a cavity on either of these surfaces extending down two-thirds of the way toward the cervical border, to cut away all the enamel. He always uses a very small matrix. He thought the best rule in regard to cleaning out a cavity was to take out as little as possible. It is not necessary to cut out all discolored dentine, as he is not as much frightened by bacteria as some folks are. If they are covered up so they will get no air, they will die and do no more harm. If fillings which have covered discolored dentine for years are removed, the dentine will be revealed in the same condition in which it was when the filling was inserted.

Subject passed.

Dr. Stubblefield read the following paper, contributed by Dr. W. D. Miller, Berlin, Germany, on

THE COMBINATION OF TIN AND GOLD AS A FILLING-MATERIAL FOR TEETH.

The subject which I have chosen to present to your consideration is one which has from time to time been brought before the profession in the current literature and in the discussions of the dental societies. It is nevertheless a new subject, inasmuch as not one out of a hundred of the dentists practicing in America has acquired a proper conception of the qualities of this material or of the manner and place in which it is to be used.

Of those who have attempted to criticise it, many have shown their entire ignorance of the nature of the material and of its action in the mouth by the thoughtless assertion that it is just the same as tin,—no more, no better.

Dr. Bonwill, who had the opportunity to inform himself on this matter while in Berlin, and who heard the discussion on tin and gold at the meeting of the American Dental Society of Europe, at Paris, showed in his presentation of the matter before the Odontological Society of Pennsylvania that his conception of the subject was on a par with that of many others who knew very little about it. Some few in America—about as many as could be counted on the fingers of one hand—have shown an interest in the subject, and have endeavored to bring it more thoroughly to the notice of the profession, without, however, as far as I have observed, being able to secure for it a place along with the other materials commonly in use for filling teeth.

Whether the combination of tin and gold is or is not a material which should be in the hands of every dentist is not a question which either requires or admits of discussion. Such men as the late Dr.

Abbot, of Berlin, Dr. Jenkins, of Dresden, Dr. Sachs, of Breslau, and many others who have used and carefully observed this material for from fifteen to twenty-five years, have given sufficient testimony to the fact that for certain cases, at least, it is better suited than any other material which we possess.

I will therefore confine myself to a brief statement of the qualities of this material, the manner of preparing and inserting it, and of the cases in which it may be used to peculiar advantage.

The material is prepared by laying a sheet of No. 4, 5, or 6 non-cohesive gold foil upon a sheet of No. 4 extra tough tin foil, cutting them into two to four strips, and rolling each strip together to a soft rope such as I have sent for your inspection (Fig. 1). These ropes may be cut into short pieces (Fig. 2), or they may be used whole in a manner similar to soft gold ribbons. The material is inserted on exactly the same principle as fillings of non-cohesive gold, and anyone who has learned to fill with the latter will have no difficulty whatever in filling with tin and gold combined. I shall not, however, take up your time with a long description of the manner of inserting the material. The instruments are few and simple. A set which I recommended some years ago is to be had, I believe, of the White Dental Manufacturing Co. Of this set I use chiefly Nos. 1, 2, 5, 6, and 7. However, almost any plugger may be used; the chief requisite being that it have a square and not a round point, as a large part of the packing is done with the side of the instrument.

FIG. 1.

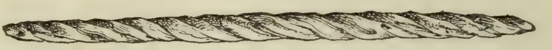
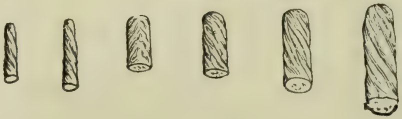


FIG. 2.



[Fig. 3 shows how the rope may with a four-sided plugger be carried to the bottom of the cavity, and one fold after another be condensed against the distal and then the mesial walls until all but the center is filled as seen in Fig. 4: the center may then be filled with pellets. Fig. 5 illustrates the manner of packing a pellet with the sides of the plugger against the walls of the cavity. In this way a number of pellets may be packed against the side *a*, and in the same manner against the other side; or the pellets may be placed alternately on opposite sides, as in Fig. 6, until at last there remains but a small hole in the center. Such centers may be filled as shown in Fig. 7. In some instances the use of a "rocker" (see Figs. 8 and 9) will push the materials toward all the walls of the cavity, and leave a hollow to be filled with gold, or with tin and gold as the case may be. Figs. 10, 11, 12, and 13 show completed fillings of the described kinds, the darker shadings serving to define either the completing

FIG. 3.

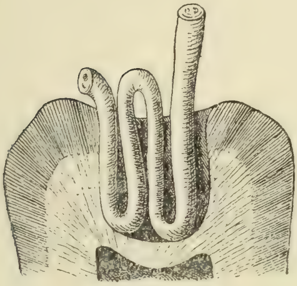


FIG. 4.

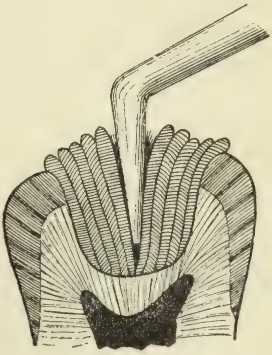


FIG. 5.

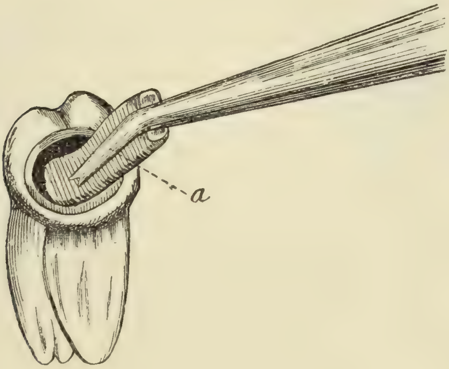


FIG. 6.

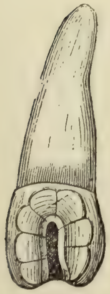


FIG. 7.

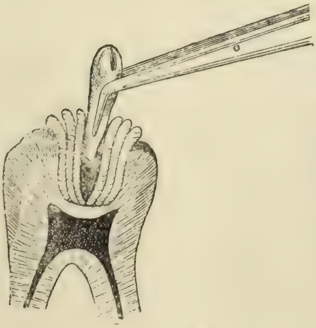
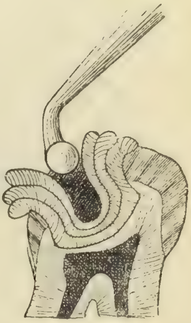


FIG. 8.



portions of gold, or of tin and gold, as the case may be.—Ed. DENTAL COSMOS.]

Properties of tin and gold.—The qualities of the combination of tin and gold which have seldom failed to gain the approbation of all who have given the material a fair trial are : (1) Its exceeding softness and adaptability. (2) The ease and rapidity with which it may be inserted. Moderate-sized cavities in the grinding-surfaces may often be filled more quickly with tin and gold than with amalgam or cement, when we calculate the time required to mix the latter materials, and eventually the time we must wait for the cement to partially harden. (3) Its indifference to moisture. A slight amount of moisture during the filling does not interfere with the progress or success of the operation. Indeed, I have made many a filling under saliva which has done perfect service for many years. (4) The consolidation of the material subsequent to its insertion. Without entering into a prolonged discussion of the causes of this consolidation, I will say that it is owing to electro-chemical process, through which the tin is dissolved and

FIG. 9.

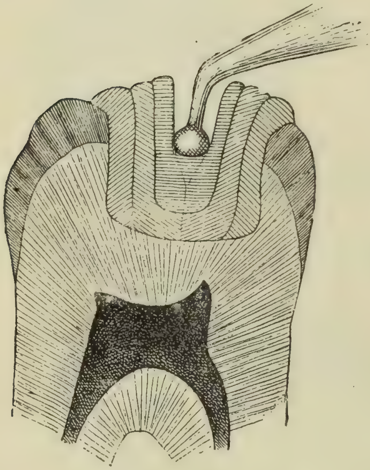


FIG. 10.

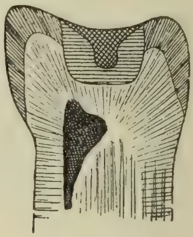


FIG. 11.

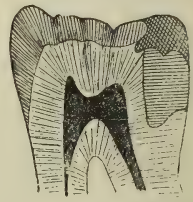


FIG. 12.

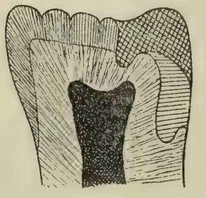
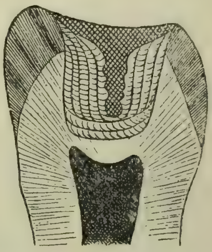


FIG. 13.



redeposited upon the surface of the gold. By this means the material becomes rigid and all parts of the filling thoroughly bound together. At the same time a slight expansion of the material takes place, leading to a more complete closure of the cavity. The difference between this material and amalgam in this respect is most striking. While we too often find the latter drawing away from the walls of the cavity and leaving a fissure, which, as we all know, is fatal to any filling, such an action is never observed in the case of tin-and-gold fillings. They invariably hug the walls of the cavity after years, just as closely as on the day they were made. (5) The combination of tin and gold is a poor conductor of heat.

The combined material has the disadvantage of discoloring more or less, assuming various shades from gray to nearly black. It, however, never discolors the tissue of the tooth.

It has neither therapeutic nor antiseptic action.

In what cases it may be used to advantage.—(1) Cavities on the grinding-surfaces of the upper and in some cases in the lower third molars may be filled in one-third of the time, with one-third of the labor and inconvenience to the patient, and at the same time be much better filled with this combination than with gold alone. (2) In cavities on the grinding-surface of molars only partly erupted, tin and gold is vastly preferable to gold alone. It adapts itself better to the soft structure, preserves the tooth better, and renders the very painful operation of adjusting the coffer-dam in this case unnecessary. (3) Cavities in poorly-developed sixth-year molars of children at the age of six to ten years are much more easily filled and better preserved with tin and gold than with gold alone. (4) Cavities on the buccal surface of the molars, particularly those lying near to or under the margin of the gums, where the insertion of gold is very difficult and painful and the success very doubtful, and where cement is worthless, may be filled with tin and gold comparatively easily, and with a greater chance of success than is furnished by any other material. In many such places its only rivals are copper amalgam and gutta-percha. (5) For small cavities in the grinding-surface of the temporary teeth, tin and gold is admirably adapted. (6) In all cases where for any reason the cavity is not perfectly freed of decaying dentine before filling, tin and gold serves an excellent purpose. By dipping the first piece in concentrated carbolic acid and placing it on the floor of the cavity, it preserves a permanent antiseptic condition and excludes to a certain extent, if not entirely, the possibility of decay going on under the filling.

Combination of tin and gold, with gold capping.—In the majority of all-gold fillings tin and gold may be used in the beginning to great advantage, shortening the operation by one- to two-thirds, rendering it much easier to both patient and operator, and securing equally good, sometimes better, results than an equally skillful operator would secure with gold alone.

Following are some of the cases in which tin and gold may be used in conjunction with pure gold :

(1) Small, deep, narrow cavities on the grinding-surface. It is simply waste of time and labor, as well as an absolutely unnecessary infliction upon the patient, to fill up the cavity with solid gold, and you have an operation done in half the time which in most cases is better for the tooth.

(2) Cavities with strong, overhanging walls which it may not always be convenient or desirable to remove—*i.e.*, "bottle-shaped cavities"—should never be filled with gold alone. They may be filled to the neck with cement or with tin-gold. In the latter case a wedge-shaped instrument is forced into the center of the filling, driving the material against the walls of the cavity, and the opening thus made filled with gold.

(3) In crown cavities of molars with numerous fissures. The outer half of each fissure may be filled with tin-gold, closing the center with gold. It lightens the operation by half for both parties.

(4) All very large and deep crown cavities approaching near to the pulp should be begun with tin-gold,—first, because of its poor conductivity for heat ; second, because of the ease of insertion ; third, because of its great adaptability.

The cavity is first filled almost full with tin-gold, packing against the walls. The center is then driven in with wedge-shaped or square instruments and then filled up with gold, which forms a key. The central gold plug may be very small, or it may be extended quite to the margin of the cavity, so that when the operation is finished only gold will be seen.

There is no occasion whatever to fear that a gold key in the center of a tin-gold filling may fall out. I have never yet observed such a case, even when the depression made in the tin-gold was very shallow. In a short time the gold combines so firmly with the tin-gold that it cannot be separated.

(5) Inestimable service is performed by tin-gold in filling compound cavities on the approximal or approximal and grinding-surfaces of bicuspids and molars. We all agree that these operations are difficult, painful, expensive, of long duration, and doubtful success. I have seen so many patients from various operators in America (some well known and some whose names I have not seen in the dental journals) that I have not been obliged to rely upon the experience which I have gathered from my own practice ; and the number of wrecks that I have been obliged to repair have forced me to the conclusion that

large cavities on the distal surfaces of bicuspids and molars cannot in the majority of cases be filled with gold with any degree of certainty that a second operation will not be necessary within three or four years.

The manifold difficulties encountered in such operations are too well known to every dentist to need particular mention here. That they may be in great measure overcome by the use of tin-gold is equally well known to all who have learned to use it. In filling compound approximal cavities with tin-gold and gold, the matrix can be employed to advantage. A pellet of the material is pressed against the buccal wall, a second against the lingual, a third as a wedge between the two, and the whole then driven against the cervical wall with the hammer. This operation is repeated until one-third to three-fourths of the approximal part of the cavity is filled with tin-gold. This is accomplished in five minutes. We then begin with the gold on the grinding-surface, and build it out over the tin-gold.

Where the grinding-surface is not implicated, we obtain anchorage for the gold cap in short grooves or pits in the lingual and buccal walls. It is surprising, however, how kindly the gold "takes to" the tin-gold and how little anchorage is necessary to retain the gold cap. As already stated, the gold firmly unites with the tin-gold in the course of time.

(6) Cavities in the upper incisors with frail labial walls and broken-down palatal walls are best served by combined fillings. Cover the labial walls with a few pellets of non-cohesive gold, and complete the operation with tin-gold. Anyone who has been in the habit of filling such cavities with cohesive gold and learned to fill them as described will experience a delightful sense of relief.

(7) For repairing defective gold fillings no material serves the purpose in many cases so well as tin-gold.

In conclusion, gentlemen, let me beg of you not to condemn the material before you have made its acquaintance. Rest assured there are many good qualities in tin and gold, and there are very many places where it is better adapted than any other material we possess. Men who are as intelligent and skillful as any who ever adorned our profession would not have clung to the material so many years if there were no good in it. Those of you who give it a trial will have no occasion to regret having done so.

Discussion.

Dr. C. S. Stockton said that he had been using gold and tin for years. The proper preparation of the cavities was the foundation of success. There were more failures from the want of enough cutting than from too much. He spoke favorably of the tin-and-gold filling for patients who could not afford to pay the price that an all-gold filling would cost, or who would not endure the operation of inserting a gold filling. A tin-and-gold filling can be inserted in one-third of the time that a gold filling could, and it will last as long in the mouth as a gold one. If desired, there is no difficulty in giving it an all-gold appearance by filling the surface with soft gold. Dr. Miller says it has no therapeutic nor antiseptic qualities; but we may say it is therapeutic, because it stops the decay of the tooth.

Dr. Gordon White said that for six years he has used tin and gold with entire success, not a single failure in any of the fillings. Some two years ago, when Dr. Carroll introduced aluminum foil, it had occurred to him that as so much had been said of copper amalgam as a filling with therapeutic or at least antiseptic qualities, copper in the form of foil might have good qualities as a filling-material. He procured some of the foil through The S. S. White Dental Manufacturing Co., and has used it with considerable satisfaction. It becomes dark, but does not discolor the teeth. It is best worked in the form of pellets; does not work well in strips or ropes. The plan for making a filling with it is to fill with copper alone, and put gold on top. It makes a very perfect filling, but works much harsher than gold or tin.

Dr. Barton asked Dr. White if he found any sign of a chemical union between gold and tin when used together in filling teeth.

Dr. White said he had not.

Dr. Barton said that was his experience; there was no chemical union at all. The fillings continued to be tin and gold, as they were when they were put in. The material is a very useful one, like soft gold alone. It is therapeutic, as it protects the tooth, but it has no chemical action of value as a filling above gold alone.

Dr. Chisholm said the advantage of the combination of tin and gold over gold alone was the superior adaptability of the former. A gold filling as perfectly adapted to the walls of the cavity would preserve the tooth as well. Beside this, the only advantage is its cheapness. It has no peculiar advantage by reason of any influence on the structure. Tin alone is a good filling-material, except where it is exposed to wear, and its softness is against it there. He knew of fillings of tin which had been useful for many years.

Dr. R. C. Young thought when tin and gold were used in the manner described by Dr. Miller there would be an electric action; the tin would be oxidized, and the oxide thus formed would have an antiseptic influence and arrest decay; and the combination was, too, a poor conductor of heat, because heat would not pass through a mass consisting of layers of different metals so readily as it would through one single metal.

Dr. Storey said the paper confirmed his practice of many years.

Some eighteen or twenty years ago he had had to remove a filling for a patient. He found it so hard that it almost turned the edge of his excavator, and he remarked to the patient that it was the hardest amalgam filling he had ever seen. The patient told him that it was not an amalgam filling, but a tin-and-gold filling, and described the process of preparing the foils very much as Dr. Miller describes them in his paper. He said that the filling had been in for twenty years, and that it was put in by Dr. Early, of West Virginia. Dr. Storey made such ropes after the description given by the patient, and found the material to work beautifully ; he has never seen a failure. A dentist who had to remove a gold filling from the mouth of a patient of his, and the only gold filling he had put into her mouth, passed some strictures upon the other fillings which had been inserted for her. There were some twenty, perhaps, all tin and gold. He told her they would all have to be removed, but Dr. Storey soon convinced her that while they were not pretty, they were preserving her teeth better than gold would. Tin and gold is better for all bad cases. To him the metals seem to unite in a homogeneous mass,—it may be because of the chemical action described by Dr. Miller.

Dr. Stubblefield said that having used the material he could not fail to indorse it, though he had been somewhat prejudiced against it within a year or so, because of a case of a patient who had a tin-and-gold filling extending quite to the cervical margin of the tooth, and who suffered with neuralgia for which he could find no cause unless it was the action of the combined metals at the margin of the gum. He had removed the filling, and the neuralgia had ceased.

Dr. J. J. R. Patrick said that he was disappointed in Dr. Miller's paper. Everything that Dr. Miller has written before this has been of a decidedly scientific character, while this paper is not. He should not have believed that it came from him. It is to be regretted he did not confine himself to the subject of the tin-and-gold filling, and give us an explanation of the action he claims for this combination. This he has not done, but has called on us to accept his statements upon the reputation of certain prominent men. We have no right to believe in men ; we want demonstration. We have all used tin and gold in combination, but he discarded it twenty years ago. The best filling he can make is a gold filling. It takes more time and patience, costs more, but it is the best filling, and is worth all it costs.

Subject passed. Adjourned.

SECOND DAY—*Afternoon Session.*

The association was called to order at 3 P.M. President Storey in the chair.

After the transaction of miscellaneous business, Dr. Stubblefield read the following paper by Arthur C. Hugenschmidt, M.D., D.D.S., of Paris, France, entitled

REMARKS ON THE CONSERVATIVE TREATMENT OF THE DENTAL PULP.

The conservative treatment of the dental pulp is a subject which has received more than passing attention. Many pages, volumes even, have been written for or against this mode of procedure.

A certain number of practitioners—the pessimist party—contend, and even recommend, that every exposed pulp should be destroyed and extirpated in order to escape subsequent troubles; while another set of operators, whom we will call the optimist party, maintain that every exposed dental pulp must be saved, and even go so far as to say that arsenious acid is absolutely excluded from their operating-room. I think, however, that a careful consideration of this important subject would probably tend to produce a great decrease in the number of followers in these two extreme camps, and would lead to the formation of a pretty numerous third party, who would doubtless admit the possibility of saving the exposed pulps in a majority of cases, leaving only a small minority for the application of arsenious acid.

The dental pulp, as we all know, is composed of an agglomeration of connective tissue and nerve-cells, bounded on its surface by a layer of peculiar cells, named odontoblasts; it is also richly supplied with blood-vessels, arteries, and veins, and no less so with nerves. Lymphatic vessels are said not to be present in the pulp; still, although I am unable to demonstrate their presence anatomically, I am absolutely convinced from the result of several clear clinical observations that *lymphatic vessels do exist in the substance of the dental pulp*.

Is it not reasonable to consider that such an organ, composed of several histological elements, mostly belonging to the connective-tissue group, and therefore similar in its anatomical constituents to almost any other part of the body, should react against any inflammatory process as any of these soft parts would do?

I am therefore inclined to think that any inflammation of the pulp ought to be dealt with as nearly as possible as we would treat a wound or any inflamed surface in any other region of the organism.

If an incised wound is inflicted, the antiseptic surgeon will do exactly what we ought to do when we expose a healthy pulp during a preparatory excavation: he will wash the wound thoroughly with the least irritating antiseptic solution available, which is, of course, sterilized water or water that has been boiled, and then bring the edges together, applying over it any antiseptic dressing. In a few days the wound will have healed without the least discharge.

Now, how do we usually treat a recently-exposed pulp? As soon as the bleeding has stopped, we immediately apply a coagulating antiseptic mixture, a mixture of either creasote or carbolic acid with oxide of zinc or oxychloride of zinc, etc., and then introduce our temporary or permanent filling. Is it really necessary to apply a coagulating antiseptic? Does this coagulum not become a foreign organic body, between the pulp and filling, which will have to be absorbed or else become a cause of disturbance, a cause of irritation, a cause for future trouble in the living organ of the tooth? No one in the surgery of wounds would think of touching surfaces which are to heal without suppuration with carbolic acid, creasote, chloride of zinc, or any such coagulants, as such a procedure is sure to be the origin of subsequent reactive inflammation highly detrimental to a union by first intention.

My practice has been, when a pulp has been exposed in the operating-chair, the dental tissues around the exposure being in a healthy condition, to wash out the cavity as thoroughly as possible with sterilized water. If I fear, however, that the cavity has been in the slightest degree contaminated, pieces of cotton dipped in an acidulated solution of bichloride of mercury ($\frac{1}{2000}$) are passed in it several times. The capping is next applied, which consists of a mixture of a very small quantity of very finely powdered iodoform or salol with lanoline, these two bodies being among the least irritating substances I know of. Over this a small plate of mica is placed, which is an excellent non-conductor, and the cavity is then filled with either oxychloride or oxyphosphate of zinc. I have never had trouble—not the least—with any case treated in the above manner.

A second class of cases is that where the pulp has been exposed for several weeks or even months, having been slightly protected either by decayed dentine or by a certain amount of food-products, which served to protect the pulp against direct injury. As soon as the cavity has been well cleansed and the pulp comes into view, it presents a cherry-red color which is far from being the light rosy pink of the normal nerve. Such a pulp is in an abnormal, diseased, or inflammatory condition; hence it ought not to be treated as is usually done, by definitive capping at the first or second sitting. Such a state of the pulp can well be compared to an inflamed wound, when no surgeon would dare at his first visit to obtain a primary union or union by first intention, as he would be sure to bring about not only local disturbances, but dangerous systemic troubles. Even after several days or even weeks of treatment, if he intends to close a wound, he guards himself by inserting a drainage-tube, which is a safety-valve in case inflammatory products should be formed or rejected.

Some of us, on the contrary, do not seem to take this fact into consideration, and if we think that a pulp is worth capping we do this at once, treating it exactly as we would a perfectly normal pulp of recent exposure. What are the consequences? This inflamed pulp or improperly treated organ, notwithstanding the cauterizing antiseptic mixture placed in contact with it, will be the source of inflammatory products, which, not being rejected, will irritate the pulp. If the patient returns to you in two or three days, he probably will say that the tooth feels pretty comfortable, and would be absolutely so were it not for sharp, shooting pains which every now and then are experienced; still, these pains will in many cases pass away gradually after a month or so; but you may be pretty sure that the pulp at the end of that time is far from being in a vitalized condition. If the patient, on the other hand, is in a poor general systemic condition, these sharp, shooting pains will become more and more marked, until one is compelled to remove either the filling or the tooth.

When we apply a coagulating antiseptic, we of course set a barrier to the further action of the remedy, as has been repeatedly and correctly stated by our confrère, Dr. Harlan, in reference to the use of coagulating antiseptics for the treatment of dead teeth. It is only the part which is brought in immediate contact with the paste that is rendered antiseptic, while the greatest part of the tooth-substance surrounding the pulp and this organ itself remain infected by the legions of micro-organisms that infect decayed teeth, and the suppurating and disorganizing process is allowed to go on as before, which sooner or later must terminate itself by the death of the pulp.

Never ought a pulp that has been exposed for some time be capped at the first or even second sitting. It ought to be treated as inflamed or infected wounds in general surgery, by antiseptic dressings, until it ceases to present the least trace of suppuration.

The *modus operandi* I have adopted has been to remove as much of the decayed dentine as possible, not hesitating to render a small exposure of the pulp larger by resecting away the diseased tissues, if I think that part to be too much infected to be thoroughly sterilized by medicinal agents alone. If the pulp is very sensitive, a saturated solution of muriate of cocaine is applied for a few minutes on the pulp, or even crystals of that salt are used. This enables one to remove much more of the decayed dentine than would probably otherwise be done, and I think that the distant result of the capping does not depend so much on the small or large exposure, but more on the quantity of decayed dentine left in the cavity, or on the state of the pulp when the permanent capping is applied.

The remedy I mostly use is iodoform, very finely powdered, which I heard so highly recommended by Prof. James Truman some years ago and which I have used ever since. If I do not always use it, it is on account of its disagreeable odor, when I substitute salol.

When the cavity has been thoroughly cleansed and the pulp is well exposed to view, we apply our dressing, which consists, for the lower teeth, of powdered iodoform or powdered salol placed over the pulp and bottom of the cavity ; for the teeth in the upper jaw, to enable its easy introduction, the powder is mixed with lanoline. When this remedy is in position, a pellet of absorbent cotton is placed over it, and then a piece of some resisting material, such as mica, or a small piece of sheet lead or gold. The cavity is then closed with the temporary obturating material, either paraffine, soft gutta-percha, or even oxychloride of zinc. If the tooth gives no trouble, the dressing is allowed to remain in for a week ; at that time everything is removed from the cavity. One is almost sure to find a trace of pus on the cotton, while the pulp has a much more normal appearance ; the red cherry color will have disappeared.

Another dressing is now reapplied in exactly the same manner, not forgetting the absorbent cotton which is placed to collect any inflammatory products ; the tooth is then again allowed to remain quiet for another week. Two to four dressings are usually sufficient, when the permanent capping can be introduced and no further trouble need be expected. At the time of capping, the pulp must have resumed its natural rosy color, and not the least trace of pus must be found on the piece of absorbent cotton of the last dressing. If, as a temporary filling, one uses during this treatment pieces of cotton saturated with a varnish of some kind, instead of paraffine or gutta-percha, one has to be particularly careful that the absorbent cotton be well separated from the other by impermeable material,—mica or a metal foil of some kind,—to prevent the varnish from being soaked up by this absorbent cotton, which would no more perform the duty expected from it.

As regards the permanent capping, I use the same preparation as in the first class of cases,—namely, a mixture of iodoform and lanoline or salol and lanoline ; over this a small piece of mica, acting not only as a non-conductor but as a protective against the pressure of the permanent filling ; over this, oxychloride or oxyphosphate.

Next, we meet with a third class of cases, the most annoying ones, where the exposed part of the pulp and its neighborhood are in a state of active suppuration ; that is, when, having carefully wiped out the cavity, you find a few seconds later a small drop appearing on the surface. Such cases, as regards antiseptic dressings, are to be treated exactly as those of the preceding class ; but there is also something more to be done, they having an actively suppurating surface. After the cavity has been well cleansed, a piece of cotton saturated with carbolic acid is applied for a few minutes on the whole exposed surface of the pulp, which exposure must be made as large as possible. After the application of the cauterizing agent, the cavity is to be closed as stated above ; but the dressing must be removed at the end of three days instead of waiting a week, and according to the appearance of the pulp and amount of inflammatory products the pulp is or is not cauterized and another iodoformed dressing applied. If on the fifth dressing no amelioration is observed as regards suppuration, the only method remaining is the destruction of the pulp.

I have met with several cases in which the suppurative process persisted, notwithstanding the fact that the exposed part of the pulp had resumed its normal color. In such cases again arsenious acid is the only remedy, for I feel convinced that the suppuration did not come from the exposed surface of the pulp, but from a distant part of that point, where a localized suppurating pulpitis was going on, the pus passing between the root-canal and the pulp, to make its exit by the point of exposure. In two cases in which I had to deal with straight roots, where the pulp could be extirpated under cocaine anesthesia without the previous application of arsenious acid, I found, even on macroscopical examination, a localized inflammatory trouble at some distance from the point of exposure, which surely could not have been treated with success by the means at our disposal.

In cases of tumors—polypi of the pulp—the only reliable remedy is the extirpation of both tumor and pulp.

In conclusion :

1. All pulps exposed in the operating-room, when surrounded by normal tissues, can be saved if carefully treated.

2. Pulps that have been exposed for some time, which are not in a state of acute suppuration, can also be saved in the greatest majority of cases.

3. Pulps in a state of acute suppuration can be cured only if the suppurating surface is exposed to view ; if the suppurative process goes on at a distant point, arsenious acid is the only remedy.

4. All tumors of the pulp require both the surgical removal of the tumor and extirpation of the whole pulp.

Discussion.

Dr. W. H. Atkinson said he did not like to refuse to indorse the paper ; but, though it contained many well-stated truths, there were some absurdities in it which had surprised him as coming from a man of Dr. Hugenschmidt's eminence. He was surprised that he claimed that a pulp could be restored after it was in a state of inflammatory retrograde metamorphosis. Any part of the body that is wounded may be restored if it is living and is supplied with the natural pabulum, but when the nature of the tissue is changed and broken down into pus it cannot be restored, and this is the state of a pulp when it has been exposed for weeks or months.

Dr. Ottolengui said he would like to defend Dr. Hugenschmidt, and at the same time did not want to antagonize Dr. Atkinson. The essayist had said that when the pulp continued to suppurate after five days he theorized that the suppuration came from below ; he did not say that he saw it.

Dr. Atkinson. He did say that he would repeat his dressings five times before he decided that the pulp could not be saved. A dressing is for the purpose of protecting an exposed part, and if a man is competent he would not need to repeat it once.

Dr. J. J. R. Patrick said that he had never saved a pulp which was ruptured, to say nothing of one which had formed pus. Dr. Atkinson tells us that there is not a portion of the body which, when inflamed, is not amenable to treatment. I hold that there are several parts which cannot be reduced when inflamed. A synovial membrane cannot be so reduced ; all the antiseptics in the world will not help it. A tooth receives its nourishment from two sources : one internal, the pulp ; the other external, the peridental membrane. We are on the wrong side of the pulp to save it. He had never saved a pulp that had been injured or that had been exposed for any length of time.

Dr. Barton said that pulps can be saved, and it is the duty of the dentist to save a pulp whenever possible. A dead tooth is not as good as one which is alive. He believed the practice of destroying pulps, as well as the practice of extracting teeth, had a bad hereditary influence, —that by destroying the tooth or the life in it we lessen or destroy the chance of reproducing a perfect tooth in the next generation. If we cap a pulp and the operation is unsuccessful, we have only a devitalized pulp,—exactly what we would have had if we had used arsenious acid ; while if it lives, we have saved the integrity of the organ.

Dr. Teague does not think it well to try to save every pulp. Sometimes it is better to destroy. He described a case in his own mouth of a tooth filled over a capped pulp, and which gave him trouble for many months before it finally quieted down, while other teeth of which the pulps had been killed had not given him any trouble at all. He also described a similar case in the mouth of a patient. No trouble could be found from the outside, so he drilled through the filling, removed the cap, and destroyed the pulp, and all trouble ceased.

Dr. R. C. Young said that a large majority of pulps could not be saved, and the effort to save them would surely end in failure. He advocated a preparation of cocaine, antipyrine, and arsenious acid in lanoline. The effect of this was the painless death of the pulp, and after eight days it can be removed without the patient's feeling it.

Dr. Rembert thought it strange that extreme views should be expressed for or against the possibility of saving pulps, a matter that we have daily experience in. A stranger who heard only one side would suppose that every exposed pulp could be saved ; hearing the other side, he would think every one must be destroyed. Now, we all know that this is a matter which requires careful discrimination in every case. If the pulp had been in good condition and was freshly injured, he should try to save it, and should expect to succeed in most cases in good localities. In cases more serious we must still discriminate. Much depends on the locality, but a large proportion of cases where the pulp has begun to be inflamed will be failures under the best conditions.

Dr. J. J. R. Patrick said that the premises of the paper were entirely wrong. It is a well-established fact that no wound can heal without the presence of lymph, and that lymph cannot exist where there are no lymphatic glands ; and these glands do not exist in the tooth. He had studied the tooth-structure with the microscope, and lymphatic glands are not present. Office experience amounts to but little, as we do not know what becomes of our cases. Sometimes they return to us after many days, and we find that the teeth we have been counting as successes have been extracted long ago by some other man.

Dr. Richards said that he had had personal experience with a capped pulp. It gave him a great deal of trouble. As bearing on the destruction of pulps of teeth and whether there was a possibility of recuperation, he narrated an experience of a tooth which had been accidentally extracted and immediately replanted by a physician, the pulp of which was alive a year or more after the accidental removal.

Dr. Catching said so much depended upon the health of the patient, the hygienic surroundings, and the climate, that every dentist must be a law to himself.

Dr. Chisholm said he would not attempt to save an exposed pulp in Alabama in the months of May, June, July, or August, or when there was malaria present. The chance is so hopeless that it is better to destroy it.

Dr. Beach said he was not destroying any more pulps now than he was twenty years ago, but he is doing it in a different way. Now he knows what he is doing ; then he found it out afterward. Sometimes he prefers to destroy the pulp, fill the tooth, and rely upon the pericementum to nourish the tooth and preserve its usefulness.

On motion of Dr. W. J. Barton, the association returned thanks to Dr. Hugenschmidt for the paper.

On motion of Dr. M. C. Marshall, the association expressed its sympathy with Dr. W. H. Morgan in his illness.

Adjourned.

(To be continued.)

The annual election was held on Saturday. Moorhead City, N. C., was selected as the place for the next meeting, August 11, 1891.

The following officers were elected for the ensuing year: G. F. S. Wright, Georgetown, S. C., president; R. K. Luckey, Holly Springs, Miss., first vice-president; W. H. Richards, Knoxville, Tenn., second vice-president; M. C. Marshall, Little Rock, Ark., recording secretary; D. R. Stubblefield, Nashville, Tenn., corresponding secretary; V. E. Turner, Raleigh, N. C., B. A. Muckenfuss, Charleston, S. C., executive committee.

AMERICAN MEDICAL ASSOCIATION—SECTION OF ORAL AND DENTAL SURGERY.

(Concluded from page 659.)

THIRD DAY.

THE section met pursuant to adjournment at 3 P.M. Dr. J. L. Williams in the chair.

Dr. Thos. H. Manley read a paper entitled

A FEW CLINICAL OBSERVATIONS ON OPERATIONS FOR CONGENITAL CLEFTS IN THE GUMS, LIPS, AND PALATE IN EARLY INFANCY.

Dr. Manley considered that as defects of development and deficiency of growth in and about the buccal and nasal cavities of varied phases and degrees are extremely common, anything offered of a practical character in connection with them would be of special interest and value to dental surgeons. Their domain, he thought, should include the whole bony framework of the alveolar arches, the palatine vault, and the cavernous sinuses of the nares covered and nourished by the membrane of Schneider.

In the process of development from birth up through the varied stages of bodily growth, it is interesting to note with the eruption of the teeth, the period of suckling, and the acquisition of speech the many delicate and complicated changes in adjustment, structure, and function observed along the outlines and walls of the oral portal,—that opening through which must pass all the aliment, the respiratory gases and phonetic sounds, and on the harmonious contour of which so much depends for expression and beauty.

His experience had led him to the conclusion that, with the exception of a fissure in the soft palate, the time at which many congenital defects in the region may be most successfully and rapidly remedied is when the infant is very young and during the early stages of development.

During the past eighteen months he had performed five operations for harelip, in all of which the gum was fissured and the floor of the nose opened through. For such operations he always preferred the earliest possible period after the delivery of the mother, believing that in the vast majority of these cases the deformity is due not to any deficiency of structure proper, but to a defective arrangement. Acting on this theory, his line of action has been to repair before ossification is well advanced, and while the parts are flexible and yield under moderate pressure.

He had observed that in every instance of a moderate osteoclasis and reposition of the separated osseous segments, the division in the soft parts almost wholly disappeared. All tension being removed, the refreshening and union of the cleft labia were accomplished with ease. His patients' ages ranged from a few days to six months.

Dr. Manley described the special features presented in a number of cases, detailing the treatment and the results in support of his theory of the advantage of early operations. Those interested are referred to the *Journal of the American Medical Association*, in which the paper will appear in full.

Discussion.

Dr. Williams asked whether in operations performed as early as those described, the sutures were not liable to be disturbed on account of the irresponsibility of the patient and the extreme softness of the tissues.

Dr. Manley said that when the necessary care was given to the case such accidents need not happen, as the silver suture holds the parts firmly in position, and there is no strain on the other sutures.

Dr. Taft asked if sepsis was not less liable to occur when the operation was performed thus early.

Dr. Manley said that was not the consideration which led him to make the early operation. We all know that in operations upon the mouth, nose, and about the eyes we can get union except in the parts brought into contact with the mucus or tears. The flow of mucus from the nose will prevent entire closure of a cleft through the soft palate, and another operation must be performed after the child has reached the age of at least six or seven years, but the replacement of the bones in position can be performed much more easily at the earliest possible age, while they are soft and pliable, than after they become hard and firm in their attachments. In chloroforming the patients for this operation he does not completely anesthetize them, but only pushes the chloroform enough to blunt the susceptibility to pain.

Dr. W. H. Morgan asked about the comparative danger in the administration of chloroform to children and adults.

Dr. Manley said he thought there was less danger to children than to adults.

Dr. Morgan said he had never heard of a case of death by chloroform in a child under ten years of age.

Dr. Williams said it might be presumed that the danger from the action on the heart would be less in children, as the dread of the operation would not exist. Excitement and fear often caused disastrous effect in older patients. He thought that if surgeons would use a saw on the dental engine instead of the chisel and mallet, there would be less danger from shock to the brain. He had known of fatal cases of injury to the brain from several teeth being filled with gold, malleted in. The action of a cutting-instrument in connection with the engine was without shock and much safer.

Dr. Talbot did not believe in the heredity of cleft palate. If these defects were hereditary, we should find them very common among the so-called defective classes, but they are not. He had examined two thousand idiots, eighteen hundred deaf and dumb and blind, and over eighteen hundred insane, and found only two cases of cleft palate. He thinks it a purely congenital trouble, the result of defective nutrition. It does not follow, however, that the mother of every child born with a cleft palate has not had proper or sufficient food, but the result more frequently comes from perverted function causing perverted nutrition, and so arrested development. He agreed with Dr. Manley as to the advisability of early operation, when the deposition of bone has not proceeded very far. There is less liability of scar or deformity when the operation is performed when the bones are soft and pliable than when deferred until they are more dense and less yielding. He thought the use of the silver wire suture, as described, might interfere with the germs of the temporary teeth.

Dr. Crawford, in reply to Dr. Talbot's remark, said that the germs of the temporary teeth would not be interfered with, because they were not germs but developed teeth, even when the child was born. There is one lesson in the paper we should all take to heart, and that is the careful conservation of tissue insisted upon, and the proper adjustment of the osseous tissue. There is apt to be too much of the soft tissue sacrificed in operations on the soft parts.

Dr. Stubblefield commended the instruction in regard to letting alone the cleft in the osseous structure ; it will be closed by nature's own action. If the operation is performed thus early, when the child grows up there will be no mark to show that a deformity ever existed.

Dr. Williams asked if the tendency to this malnutrition might not be hereditary?

Dr. Talbot asked whether the essayist had ever noticed in operations for cleft palate a little opening in the hard or soft palate supposed to be caused by the dripping of the mucus from the nares. It usually exists, and is very difficult to close up. Dr. Garretson had told him he never tried to close it by sutures, but touched it every day with nitrate of silver and got it to close up by granulation.

Dr. Manley said he had not claimed that more than one or two of the cases were due to heredity. There was a history of cleft palate in each of these cases : one in the father of the child, the other in a cousin of the child's mother. In two other cases the previous children of the same mothers had had cleft palate ; both were operated on and both died. He had really no opinion of the cause. Such peculiar deformities as harelip, club-foot, squint, etc., are due to some nervous influence which we do not understand. In regard to the injury to the teeth by the silver wire suture, he did not think that in early operations there is much danger, and that is an additional reason why the operation should be performed early, as the destruction of these teeth would result in permanent contraction of the jaw and irregularity of the permanent set. In the case operated on at six months he feared that he would interfere with the teeth, as the age for their eruption had arrived, but the suture did not encounter them. In regard to the question about the opening in the palate, he had not seen such cases. He had done very little in the way of staphylorraphy, his aim having been to perform this operation for harelip and get the closure of the bones, and so avoid the deformity which is so unpleasant. This opening is probably caused, as Dr. Talbot says, by the mucus dripping through. Some operators on cleft palate cut away the intermaxillary bone. Its preservation is of the utmost importance, as it carries the four front teeth, and if it is sacrificed the jaws will contract and disfigurement will result ; moreover, the masticating function of the teeth would be interfered with, as the falling in would be so great that the molars could not be brought into position. He had never seen a case where this bone was sacrificed and the patient grew up but he considered a patient so treated as ruined.

Wm. D. Hamilton, M.D., read a report of five cases of removal of the jaw for tumors which came under his observation in his service at the Mount Carmel Hospital within the past three years. Three concerned the superior and the remaining two the inferior maxilla. The youngest patient was twelve and the oldest fifty-five years of age.

In conversation with the eminent surgeon, Mr. Thornley Stoker, of Dublin, last summer, Dr. Hamilton was told that one of his patients, for whom he had recently extirpated the upper jaw for sarcomatous disease, was a man eighty years old. A still more interesting fact was elicited, that he was discharged from the hospital cured in a fortnight.

In this department of oral surgery the operator is confronted with certain facts at the outset : (1) difficulty in maintaining anesthesia ; (2) the impracticability of observing with nicety antiseptic details ; (3) the tendency to hemorrhage and shock.

The renewal of the anesthetic on account of the returning consciousness of the patient upon whom such an operation is being performed is a most embarrassing and pathetic necessity. It frequently means the recurrence of vomiting and the loss of invaluable time. The resort to a preliminary tracheotomy, while possessing certain advantages as a mode of administration, is by no means free from danger to the lungs and air-passages which it is intended to protect, while its performance must add materially to the shock.

Unfortunately, the mouth is frequently found to be in an unhealthy condition. The irregularities of the growth which may prevent separation or closure of the jaws, the occasional existence of a foul ulcer that has been irritated by opposing teeth, the numerous hiding-places for septic matter, enhance the difficulty of preventing suppuration. It is all the more incumbent upon the surgeon, however, to aim at thorough cleanliness. There should be liberal irrigations with a harmless antiseptic lotion, like boric acid in aqueous solution, and in this way all removable matter should be disposed of in the few days prior to the operation. The strict observance of extrinsic antiseptic details is as clearly imperative in such cases as in other surgical procedures.

While benefit may sometimes be derived from a preliminary tying of the external or common carotid, it was not seriously contemplated in any of the cases reported. In dealing with the facial artery and veins the knife was carried quickly down to the bone, dividing them clean with one stroke. Their prompt seizure with hemostatic forceps prevents the loss of much blood and simplifies the operation. Digital pressure by an assistant is available during their isolation.

With reference to shock, it may be said that time is a most important element. In order to minimize the duration of the ordeal, scrupulous care should be taken to have a simple reliable armamentarium at hand, consisting of strong instruments in perfect condition. For completing the division of bone a pair of powerful straight pliers, with short jaws and long handles, giving great leverage, is invaluable. For ligating vessels, properly prepared silk is preferable. A precaution which should never be neglected is to transfix the tongue with a coarse silk thread, the ends being tied together and held by an assistant.

It is perhaps needless to observe that anesthesia should be very profound before beginning. Again, it is a rule applying to all such undertakings to postpone entering the cavity of the mouth as long as is consistent with method. Therefore the bone should be freed as extensively as may be before the mucous membrane is divided. In this way blood can often be kept outside the throat until the operation is well-nigh completed.

Dr. Hamilton then gave in detail the characters and complications of the several cases, the surgical procedures, and the results, which were exhibited by photographs of the patients before and after the operations, as well as by the removed maxillas.

Discussion.

Dr. Talbot said he thought it would be an advantage if surgeons were better acquainted with the improved facilities which some dental appliances would give in their operations. He did not see why it should be necessary to use such tools as the hammer, the chisel, and the saw for operations like those described when the dental engine was so well adapted for the purpose.

Dr. Taft said the skill to use a dental engine is not acquired in a day. Dentists ought to study tumors more than they do as a rule ; not necessarily for the practice of that kind of surgery, but so that they could give intelligent advice as to what course should be pursued. The general advice in such cases, if the growth is not exceedingly painful, as it is not apt to be, is to wait ; and to wait is sometimes fatal. We should know more of abnormal growths, so as to be able to diagnose them correctly. The question of recurrence in such cases depends largely upon the extent of the territory invaded and the entire removal of the affected tissue. A tumor may exist and grow without affecting the surrounding tissues, except by impinging upon them and by pressure inducing disease in them. Such a tumor is not malignant, and if removed the disease is cured, but if not removed it may cause death.

Dr. Stubblefield asked if the recurrence of a malignant tumor was not likely to result from the same constitutional condition which caused the original growth.

Dr. Hamilton said that with growths having a constitutional cause the removal cannot be so radical that a new growth might not occur.

Dr. Taft said the persistence of these growths depends largely upon the soil in which they grow. The rapidity of growth is also governed by the same cause. There is much difference in the constitutional character of the tissue, the susceptibility of the individual, or of the same individual at different times. It is the same with wounds : in some they will heal by first intention ; in others every scratch will cause inflammation and suppuration, and will only heal by the tedious process of granulation. The discussion has been going on in medical circles for years whether cancer and allied growths were local diseases with constitutional manifestations, or constitutional disease with local manifestations. In cases where cancer of the breast had been removed, though the glands under the arms appeared quite healthy yet upon microscopical examination they were found to be already sarcomatous.

Dr. Manley said that such growths, if malignant, would return, and probably, unless operated upon again, kill the patient at some time. Many would say, Then why do an operation if the effect is only to be temporary? All our operations are temporary ; even filling a tooth does not insure the tooth for the life of the patient. By an operation such as described by Dr. Hamilton, if life is extended for a year or two it would be worth all the pain, the risk, and the expense of the operation. The history of such cases shows that the reappearance of the tumors is governed by no fixed rules. Sometimes they return almost immediately, sometimes not for years, or even not at all. As Dr. Taft has said, every dental surgeon should be perfectly familiar with these growths, or he is not worthy of the name ; he should be able to diagnose them and advise about the necessity of operation, but he should not undertake to operate unless he has the knowledge, the implements, and all the resources of a skilled operator.

The section then adjourned.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE seventh annual session of the National Association of Dental Faculties was held at Excelsior Springs, Mo., commencing Monday, August 4, 1890.

The following colleges were represented :

Baltimore College of Dental Surgery, M. Whilldin Foster.
Boston Dental College, Wm. Barker.
Chicago College of Dental Surgery, Truman W. Brophy.
Kansas City Dental College, J. D. Patterson.
Missouri Dental College, W. H. Eames.
Ohio College of Dental Surgery, H. A. Smith.
Pennsylvania College of Dental Surgery, C. N. Peirce.
University of California, Dental Department, C. L. Goddard.
University of Iowa, Dental Department, A. O. Hunt.
University of Michigan, Dental Department, J. Taft.
University of Pennsylvania, Dental Department, James Truman.
Vanderbilt University, Dental Department, D. R. Stubblefield.
Louisville College of Dentistry, A. Wilkes Smith.
Indiana Dental College, J. R. Clayton.
Dental Department of Southern Medical College, L. D. Carpenter.
Dental Department of University of Tennessee, R. B. Lees.
University of Maryland, Dental Department, John C. Uhler.
Columbian University, Dental Department, H. B. Noble.

On motion, Dr. J. D. Patterson, Kansas City, was elected secretary *pro tem*.

The following resolution, offered by Dr. Hunt, was adopted :

RESOLVED, *That in all colleges of this association students to be graduated at the expiration of two years after admission must enter the school not later than twenty days after the opening of the regular session following this meeting.*

The amendment to the constitution laid over from last year, providing for changing the name of the association to American Association of Dental Faculties, was lost.

Applications for membership laid over last year, under the rules, were taken up and the following were admitted: Royal College of Dental Surgeons of Ontario; College of Dentistry, Department of Medicine, University of Minnesota (represented by Dr. W. X. Sudduth); American College of Dental Surgery (represented by Dr. E. P. Hazen).

The following applications for membership were laid over under the rules: Dental Department of Howard University, Washington, D.C., and College of Dentistry, University of Denver.

The resolution offered by Dr. Patterson and laid over last year under the rules was taken up, amended, and adopted as follows:

Resolved, That after the session of 1890–91 a diploma from a reputable medical college shall entitle its holder to enter the second course in dental colleges in this association, but he may be excused from attendance upon lectures and examinations upon the following subjects: general anatomy, chemistry, physiology, and materia medica and therapeutics.

Dr. Marshall's amendment to the constitution, providing that in all matters not in conflict with Article V of the constitution a majority of the colleges belonging to this association shall constitute a quorum, was taken up and adopted.

The following resolution, offered by Dr. Hunt, was adopted:

Resolved, That we recommend that students take two full courses in studies of a general character, such as anatomy, physiology, chemistry, general principles of surgery, and materia medica and therapeutics, and three courses in those of a special dental character.

Dr. Goddard offered the following resolution, which was adopted:

Resolved, That final examination may be taken at the end of the second year in three general studies.

The following, offered by Dr. Truman last year and laid over under the rules, was adopted:

Recommended, That for a full annual course of lectures the minimum sum of college fees be $100; that diploma fees be omitted, and an examination fee of not less than $25 be substituted therefor and made non-returnable; that a matriculation fee of $5 be charged annually. Special-course fees to be $10 for each branch taken, and $5 matriculation fee.

The following officers were elected for the coming year: L. D. Carpenter, Atlanta, Ga., president; W. H. Eames, St. Louis, Mo., vice-president; J. D. Patterson, Kansas City, Mo., secretary; H. A. Smith, Cincinnati, O., treasurer; J. Taft, Cincinnati, O., Truman W. Brophy, Chicago, and A. O. Hunt, Iowa City, Ia., executive committee.

The following committees were appointed : James Truman, Philadelphia ; Frank Abbott, New York ; and John S. Marshall, Chicago, *ad interim* committee ; J. A. Follett, Boston ; D. R. Stubblefield, Nashville, Tenn. ; A. Wilkes Smith, Richmond, Ky. ; C. L. Goddard, San Francisco, committee on schools.

Adjourned to meet on Saturday, August 1, 1891, at 10 o'clock A.M., at the place appointed for the next meeting of the American Dental Association.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE ninth annual meeting of the National Association of Dental Examiners was held at Excelsior Springs, Mo., commencing Monday, August 4, 1890.

The following State boards were represented :

Colorado, Dr. P. T. Smith.

Illinois, Dr. C. R. E. Koch.

Iowa, Drs. S. A. Garber, E. E. Hughes, and E. D. Brower.

Pennsylvania, Dr. Louis Jack.

Maryland, Dr. T. S. Waters.

Kansas, Drs. L. C. Wasson and A. M. Callaham.

Ohio, Drs. J. Taft and H. A. Smith.

Minnesota, Dr. J. H. Martindale.

During the sessions the Board of Registration in Dentistry for the State of Rhode Island and Providence Plantations, represented by Dr. Wm. P. Church, was elected to membership.

In the absence of the secretary, Dr. F. A. Levy, Dr. J. H. Martindale, of Minnesota, was elected secretary *pro tem.*

After discussion, the following resolution, offered by Dr. Jack and amended by Dr. Koch, was adopted, on motion of Dr. Taft :

> *Resolved*, That this body recommends the various examining boards under no circumstances to grant temporary licenses to dental students at any period of their course of instruction, whenever their State laws will permit them so to do.

Drs. Jack, Garber, and P. T. Smith were appointed a committee to formulate the principles which this association would recommend should be incorporated in the State laws. This committee subsequently presented a report which, as amended and adopted, recommended the following principles for incorporation in laws for the regulation of dental practice or for the guidance of those framing them :

1. The creation of boards of examiners in each State.

2. The boards to be officially created by the constituted appointing power of the various States, the appointees to be selected from a num-

ber of names presented by the representative State societies; each State society at its annual meeting placing in nomination not more than two names for each appointment to be made.

3. Recognizing five years' actual practice at the time of the passage of the law as qualifying for the continuance of practice.

4. Empowering the examining boards to examine and grant certificates to non-graduates, provided the candidates present satisfactory evidence of having had at least five calendar years of instruction.

5. These and all other examinations to be both oral and written, and candidates to be also subjected to tests of practical skill.

6. Empowering the boards to examine graduates in dentistry.

7. Prohibiting medical graduates without special qualifications practicing dentistry.

8. Requiring medical graduates to have their special qualifications determined by the same tests as other non-graduates in dentistry (see No. 5).

9. Making failure to pass the required examination in any one branch sufficient cause for refusal to grant the certificate.

10. Making failure in the practical tests in either of the two general departments of dentistry work disqualification.

11. Expressing the opinion that examinations for the special degree in dentistry should be conducted by a board of examiners established by law in each State, instead of by faculties as at present; and the belief that the power to grant degrees must at length become vested in boards created for the purpose.

12. Conferring on State boards the power to revoke, for cause, a certificate of qualification previously granted.

The secretary was directed to call the attention of the American Dental Association to the fact that a case involving the constitutionality of the law regulating the practice of dentistry in New Hampshire is now pending in the Supreme Court of the United States, and asking them to see to it that it does not go by default.

Dr. Koch, from the committee on dental colleges, reported the following schools the diplomas of which this association recommends that the State boards indorse:

American College of Dental Surgery, Chicago, Ill.

Baltimore College of Dental Surgery, Baltimore, Md.

Boston Dental College, Boston, Mass.

Chicago College of Dental Surgery, Chicago, Ill.

College of Dentistry, Department of Medicine, University of Minnesota, Minneapolis, Minn.

Dental Department, Columbian University, Washington, D. C.

Dental Department of Northwestern University, Chicago, Ill. (Now University Dental College.)

Dental Department of Southern Medical College, Atlanta, Ga.

Dental Department, University of Tennessee, Nashville, Tenn.

Harvard University, Dental Department, Cambridge, Mass.

Indiana Dental College, Indianapolis, Ind.

Kansas City Dental College, Kansas City, Mo.

Louisville College of Dentistry, Louisville, Ky.

Minnesota Hospital College, Dental Department, Minneapolis, Minn. (Defunct.)

Missouri Dental College, St. Louis, Mo.

New York College of Dentistry, New York, N. Y.

Ohio College of Dental Surgery, Cincinnati, O.

Pennsylvania College of Dental Surgery, Philadelphia, Pa.

Philadelphia Dental College, Philadelphia, Pa.

School of Dentistry of Meharry Medical Department of Central Tennessee College, Nashville, Tenn.

St. Paul Medical College, Dental Department, St. Paul, Minn. (Defunct.)

University of California, Dental Department, San Francisco, Cal.

Northwestern College of Dental Surgery, Chicago, Ill. (The diplomas of this college are discredited after 1889.)

State University of Iowa, Dental Department, Iowa City, Ia.

University of Maryland, Dental Department, Baltimore, Md.

University of Michigan, Dental Department, Ann Arbor, Mich.

University of Pennsylvania, Dental Department, Philadelphia, Pa.

Vanderbilt University, Dental Department, Nashville, Tenn.

The following officers were elected for the ensuing year: C. R. E. Koch, Chicago, Ill., president; L. C. Wasson, Topeka, Kan., vice-president; J. H. Martindale, Minneapolis, Minn., secretary and treasurer. The president appointed as the committee on dental colleges, Drs. Louis Jack, T. S. Waters, E. E. Hughes, W. P. Church, and J. H. Martindale.

On motion, the following committee was appointed to consider the advisability of holding the meetings at some other time and place than the annual meetings of the American Dental Association, with discretionary power in the matter: Drs. J. Taft, F. A. Levy, and S. A. Garber.

Adjourned to meet at the call of the president.

NORTH CAROLINA STATE DENTAL ASSOCIATION.

THE sixteenth annual meeting of this association was held in Wilmington, N. C., June 24 to 27, 1890. Dr. Sid. P. Hilliard delivered the annual address.

Dr. C. A. Rominger read a paper entitled "Contradictory Nonsense,'' which was devoted to an exposé of the fallacies of extremists in theory and practice.

Dr. N. M. Culbreth read a paper on ''Dental Ethics,'' advocating a high standard of honor between practitioners, their patients, and fellow-practitioners.

Dr. C. A. Rominger read a paper on ''Pulp-Capping.'' He claimed a large percentage of success in capping pulps, and detailed a number of cases of exposure by decay in which capping and filling had been resorted to, the teeth remaining comfortable to date. He thinks many failures result from a too free use of caustics. A pulp accidentally exposed needs no treatment whatever. The cavity should be thoroughly dried, the pulp covered with a thin coating of gutta-percha dissolved in chloroform, and then with oxyphosphate of zinc cement mixed thin enough for introduction without pressure. After this has hardened, make permanent filling with gold or amalgam. He claimed that where two or more substances were employed in a filling, even though they were all moderately good conductors, the dissimilarity of the materials made them of less conducting quality. Thus gutta-percha used as a capping, oxyphosphate cement as a bridge, and gold or amalgam as a filling, will render a tooth less liable to impressions of cold or heat.

In cases of exposure by caries and where the pulp is in a state of irritation, after preparation of the cavity, wash it out with oil of cloves, and dry with alcohol. Of fifty recorded cases he had had but five failures, and in two of these the pulp was nearly dead when capped.

Dr. F. S. Harris read a paper entitled ''Pathology and Therapeutics,'' urging a conservative treatment and an effort to preserve the pulp alive whenever possible. In a case of accidental exposure of a pulp he makes a disk of adhesive plaster cut to suit the case, and with it bridges over the point of exposure, covering this subsequently with cement. In regard to the treatment of pulpless teeth he recognized two classes: in those in which there had been no pain he thoroughly cleanses the canals with peroxide of hydrogen carried with a Donaldson canal-cleanser wrapped with cotton, taking great care not to force any débris through the apex. If there is no evidence of pus, and the tooth is not sensitive to percussion, he thoroughly dries the canals, wipes them out with carbolic acid, and fills with gutta-percha canal-points, having just previously wiped out the canals with chloroform.

In a second class of dead teeth, the contents of the canals being in a fluid state, or an abscess present, he cleanses the canals with great care with peroxide of hydrogen, and stops them very lightly with a few fibers of cotton saturated with phenol, continuing this treatment from time to time until all inflammation has subsided and no evidence of pus can be detected.

Dr. A. J. Pringle read a paper upon "Tobacco: its Deleterious Effects upon the General System and its Local Effects in the Oral Cavity."

Dr. J. E. Wyche read a paper by Dr. A. O. Daniels on "Disinfectants and Antiseptics." In the treatment of teeth having dead pulps he advocates washing the canals, after removal of their contents, with an alcoholic solution of bichloride of mercury $\frac{1}{1000}$, subsequently using carbolic acid or creasote, and filling at the same sitting. He thought that many teeth with abscesses were over-treated. Of fifty recorded cases of teeth with devitalized pulps, he knew of only two that were failures.

Dr. H. D. Harper contributed a paper explaining in detail his methods of taking impressions, flasking, vulcanizing, etc., and Dr. J. S. Spurgeon read a paper also on Prosthetic Dentistry.

Dr. E. L. Hunter read a paper on "Operative Dentistry." After a brief review of the objects sought in operative dentistry, the difficulties in the way of success, and the various methods employed, he discussed at length some of the more important details. He thought that the improvements in plastic gold have been so great that it may be said to have almost superseded soft foil even at the cervical wall, where formerly it was so much relied upon, since it makes closer adaptation and firmer adjustment than soft foil, and offers at the same time a better surface for building upon. He believed that a water-tight joint was all-important, and experience had taught him that soft teeth with approximal cavities do better with amalgam at the cervix and gold for the bulk of the filling than they would with either material alone,—the little battery thus formed being perhaps a valuable factor in the saving process.

Of the combination of tin and gold in the same cavity, either separately or together in a fold or ribbon, both theory and experiment demonstrate the value. When a sheet of tin is inclosed between two sheets of gold, both No. 4, and a double-width strip cut off and folded once on itself it will, with a point of sufficient size having sharp serrations, work beautifully after a modified manner of working cohesive gold, or it may be treated as soft foil used to be. It possesses much better wearing qualities than tin, but not so good as gold.

Of pulp-exposure and treatment he said that sometimes we can almost certainly and sometimes we cannot almost certainly have good results. If congestion has ripened into inflammation, it is safer to devitalize at once.

He thought that the bridge-work fever of to-day offers a glaring example of the tendency to overdo a good thing. While the materials for root-filling are being discussed, the fact remains that the more important point is in the preparation and manner of filling or closing the apex. If it has been found necessary to enlarge the foramen, then the choice of material would seem to lie between gutta-percha and wood. Where the former is used, care should be taken to measure the root up to the point where the stopping is to rest, and with the same instrument upon which the measure has been indicated carry the gutta-percha to the point. Care should be taken to cut a section that will pass into the foramen with slight force ; it cannot be forced through without doing harm. In his opinion there is nothing better for filling the remainder of the canal than oxychloride cement on fine shreds of cotton, both on account of the nature of the material, and the fact that little force is required to carry it home.

A fruitful cause of failure with amalgam fillings, and indeed with fillings of all other materials in approximal cavities, is in not having teeth moved so as to be sufficiently apart at the cervices, so that the fillings could be properly finished at the cervical margins.

Matrices are especially valuable in the use of plastics, giving opportunity for producing a greater degree of density in the filling, and attaining the form of contour desired, while when a material like gold is to be used, requiring careful adjustment of each small piece, direct vision, and unobstructed approach, and to have the gold packed against and drawn over the margins, the matrix is a delusion and a snare.

Of pyorrhea alveolaris the essayist confessed that he had no very positive convictions. His experience taught him that there is one type of the disease in which the prognosis is doubtful under the best local and constitutional treatment yet suggested. In this form there is from the first but little calculus. In another type the trouble begins with a deposit of calculus, increasing in quantity until it produces pyorrhea. This form is amenable to local treatment ; the first type he believes to be a local manifestation of a constitutional cause, and that under the best local treatment there is not manifest that disposition toward a healthy condition which is so apparent in cases where the cause is purely local.

Dr. W. W. Rowe read a paper on "New Appliances." He called attention to the improved rubber hood with inflatable cushion, to Dr. Daintree's mouth-prop, and to the Case and the Gould dental chairs.

He criticised permanent bridge-work, saying that the more he saw of it the more he was convinced of its unstable character. Removable bridge-work consisting of two or three teeth when properly made he indorsed, but the attempt to make a nearly full set on three or four roots and call it permanent deserved only condemnation. He spoke enthusiastically of some of the new methods of crown-work, and especially of the Logan crown, which in his experience was standing the test of time. He advocated their use on devitalized roots instead of unsightly contour fillings. He advocated the use of porcelain inlays in front teeth, and said that when properly fitted and cemented they could be classed as permanent.

The programme of clinics was carried out with a single exception, and the meeting was pronounced to have been a gratifying success.

MISSOURI STATE DENTAL ASSOCIATION.

THE twenty-sixth annual meeting of the Missouri State Dental Association was held at Pertle Springs (Warrensburg), Mo., July 8 to 11, 1890; the president, Dr. Henry Fisher, in the chair.

The following action was taken on the death and resignation of members:

A committee, consisting of Drs. B. Q. Stevens, G. M. Risley, and James L. Leavel, reported resolutions, which were adopted, expressive of the sorrow of the association at the death of Dr. A. Noland, of Monroe City, which occurred on the 22d of January last. The resolutions characterized Dr. Noland as a faithful colaborer and student, and expressed the sympathy of the association with his bereaved family.

Drs. W. H. Eames, C. W. Spalding, and J. C. Goodrich, committee, presented resolutions, which were adopted, on the death of Dr. Homer Judd, whose obituary appeared in our July issue. Dr. Judd was active in the organization of the association, and his labors in extending its usefulness throughout the State were acknowledged, the resolutions reciting that "his noble character, energy, and literary attainments entitled him to an exalted place on the scroll of deceased members." Condolence was tendered to the family in their affliction.

Resolutions of farewell were also passed (reported by a committee consisting of Drs. James A. Price, T. W. Reed, and F. Swap) complimentary to Dr. C. W. Spalding, whose resignation as a member of the association had been received. Dr. Spalding's high character and eminent professional services were duly acknowledged.

The following officers were elected for the ensuing year: J. F. McWilliams, president; George L. Shepard, vice-president; W. H. Buckley, second vice-president; John G. Harper, recording secretary; William Conrad, corresponding secretary; and James A.

Price, treasurer. The board of censors consists of Drs. J. G. Hollingworth, W. L. Reed, and Charles L. Hungerford.

The next meeting will be held at Louisiana, Mo., on the first Tuesday after July 4, 1891.

William Conrad, *Corresponding Secretary*,
No. 321 N. Grand avenue, St. Louis, Mo.

COLORADO STATE DENTAL ASSOCIATION.

The fourth annual meeting of the Colorado State Dental Association was held in Denver, June 24 to 26, 1890.

The following papers were read: "Dental Caries as Influenced by Acids," by H. A. Fynn; "Dentistry of To-day," by M. H. Smith; "Microbes," by A. H. Sawins; "Separating Teeth previous to Filling,—is it Advisable?" by W. E. Griswold; "Does Altitude affect the Teeth?" by C. F. Dodge; "Fees," by J. M. Porter; "Pulpless Teeth," by H. P. Kelley; and "Pyorrhea," by P. T. Smith.

The paper "Does Altitude affect the Teeth?" elicited the general opinion that the irritated or exposed pulp stands in greater peril in a high than in a low altitude, though this was not the universal belief among the members. The altitude of the capital of Colorado is about one mile higher than that of New York City.

The following officers were elected for the ensuing year: C. F. Dodge, president; J. N. Chipley, first vice-president; H. A. Fynn, second vice-president; W. A. Smith, recording secretary; J. H. Parsons, corresponding secretary; William Smedley, treasurer.

The meeting closed with a banquet tendered by the Denver members.

J. H. Parsons, *Corresponding Secretary*,
Boulder, Col.

NEW JERSEY STATE DENTAL SOCIETY.

The twentieth annual meeting of the New Jersey State Dental Society was held at the Coleman House, Asbury Park, N. J., commencing Wednesday, July 16, 1890, the sessions continuing for three days.

The following officers were elected for the ensuing year: George Emery Adams, president; B. F. Luckey, vice-president; Charles A. Meeker, secretary; and George C. Brown, treasurer. The State Board of Examination and Registration in Dentistry consists of Drs. Fred. A. Levy, Orange; G. Carleton Brown, Elizabeth; F. C. Barlow, Jersey City; and E. M. Beesley, Belvidere.

Charles A. Meeker, *Secretary*,
No. 29 Fulton street, Newark, N. J.

MISSISSIPPI STATE DENTAL ASSOCIATION.

At the meeting of the Mississippi State Dental Association, at Jackson, June 4, 1890, the following officers were elected for the ensuing year:

R. K. Luckie, president; J. H. Magruder, first vice-president; T. B. Birdsong, second vice-president; S. W. Johnson, third vice-president; T. C. West, corresponding secretary; E. M. Hight, recording secretary, and I. B. Rembert, treasurer. Dr. T. O. Paine was recommended to the governor as a suitable member of the board of dental examiners.

Biloxi was chosen for the next place of meeting.

T. C. West, *Corresponding Secretary*,
Natchez, Miss.

GEORGIA STATE DENTAL SOCIETY.

The twenty-second annual meeting of the Georgia State Dental Society was held at Gainesville, Ga., July 9 to 12, 1890; the president, Dr. S. B. Barfield, in the chair.

The meeting was well attended, and in many particulars of unusual interest to the profession in this State.

The following officers were elected for the ensuing year: R. B. Adair, president; W. G. Brown, first vice-president; S. M. Roach, second vice-president; J. H. Boozer, recording secretary; L. D. Carpenter, corresponding secretary; and H. A. Lowrance, treasurer.

The next place of meeting will be St. Simon's Island, near Brunswick, the time yet to be determined.

L. D. Carpenter, *Cor. Secretary*,
Atlanta, Ga.

OHIO STATE DENTAL SOCIETY.

The annual meeting of the Ohio State Dental Society will be held at Columbus, October 28, 29, and 30, 1890.

Members of the dental profession are cordially invited to be present and participate in the proceedings. Those having new appliances or methods of practice for the good of the profession are solicited to communicate with the Executive Committee, who will afford them the opportunity for their proper presentation.

The executive committee is composed of Drs. A. F. Emminger, W. H. Todd, and Otto Arnold, and may be addressed at No. 62 East Broad street, Columbus, O.

EDITORIAL.

THE EDITORIAL FUNCTION.

THERE appears to be a curious misapprehension in the minds of some recent writers and speakers regarding the exercise of the editorial function in the conduct of a dental journal. According to Webster, an editor is one who prepares, superintends, revises, and corrects a book, magazine, or newspaper for publication; and an editorial is defined as an article by the editor. The principal work of the editor is to superintend, revise, and correct for publication; to determine what to publish, in whole or in abstract; the time and order of publication, etc. If, in addition to this oversight of contributed and selected matter, the editor sees proper to write an article on any topic relevant to the interests which his journal represents, he may elect whether to publish it as an original communication under his own proper name, or as a contribution without name of author, or as an editorial. In any case the article, whatever its subject or its character, should be judged—criticised, commended, or condemned—on its merits alone. Editorial opinion is at best merely the expression of the sentiments, views, or opinions of one man, and they are entitled to neither more nor less consideration than those of any other man of like ability. The editor's criticisms, commendations, condemnations, exhortations, denunciations, theories, or arguments are worth nothing except as they appeal to the judgment of the reader. It may well be that an editorial deserves unfavorable comment, and the editor has no occasion of complaint if his critic but bear in mind that an editorial is the contribution of an individual, and has no claim upon and should have no weight with the reader beyond that which would be accorded to it if it were a contribution from any other writer.

If this view be correct, it follows that an editor may properly discourse upon any subject within the lines deemed proper for the journal which he conducts. In the case of a dental journal, whether he is or has been a practitioner of dentistry; whether he has or has not a diploma; whether he is or is not connected with an association, a college, or a board of examiners, he may with equal propriety give expression to his views concerning theory or practice, dental education, dental legislation, dental associations whether local, national, or international, or upon any other relevant topic. But upon what subject soever he writes, he should not expect nor desire for his contribution either more or less consideration than his treatment of the subject entitles it to.

If the editorial function were better appreciated, we should not hear complaints on the one hand of "silence and the weaker-than-water counsel when clear, forcible, and true opinions were needed,'' and on the other hand we should not be asked, ''Who authorized the editor of the —— to prescribe for the dental profession the kind of subjects they should discuss at their meetings?'' Nor would the editorial criticism of a paper forming part of the proceedings of the American Dental Association be deemed ''a dictation bordering on actual usurpation.'' Nor would such allusions be made as the following: ''Scarcely qualified to sit in judgment upon professional matters''; ''Liable to the charge of impertinent intermeddling''; ''An advocate who has no standing in court assumed to sit as a judge in a strictly professional matter.''

Must an editor be a clergyman before he may feel free to comment on the proceedings of a ministerial association, a general before he may criticise a military movement, an actor or be debarred from expressing an estimate of a play or of its presentation, an artist by profession or be supposed not to have an opinion of sculpture or painting? Must an editor have been a New York alderman before he may call attention to the corruptions of municipal government? The editor of a daily newspaper writes upon any topic which he deems likely to be of interest to his readers. He may say things that are wise or otherwise; but if he is arraigned it should be for the character of his writing, not because he transcends his function in presenting his views on any public question.

Sacred history tells us of a nobleman who listened—and to his immense advantage—to the suggestion of a little serving-maid. The familiar proverb, ''A cat may look at a king,'' expresses the idea that it is not the prerogative of a class to be above and beyond the criticism of those not of equal rank, but who may nevertheless have convictions and a disposition to express them. The sum of the matter is that it is not who says it, but what is said, that entitles any contribution, editorial or otherwise, to consideration.

It is related that a member of Mr. Beecher's congregation once took him to task for utterances in the pulpit of which he, the member, highly disapproved. Mr. Beecher is credited with the reply, ''Oh, if you only knew the things I want to say sometimes and don't, you would not find fault with what I do say.'' The probability is that another good brother was mentally if not openly censuring him for the failure to express the thoughts which he did not give utterance to. Thus editor and preacher are alike unable to please all, and are alike open to the conflicting criticism of ''weaker-than-water counsel,'' and ''dictation bordering on usurpation.'' Happy the editor who knows just what to say and what to avoid saying; who says that, and only that, which the subject or the occasion requires, and whose views and their expression commend themselves to his readers.

THE NEW ENGLAND GATHERING.

THERE will be a noted gathering of the dental profession of New England in a grand union convention in Boston, October 28 to 31, 1890. Some fourteen or fifteen societies, State and local, will be represented. We trust that the outcome will be all that the most sanguine could anticipate. Opportunity will be afforded for an exhibition of dental supplies, which will undoubtedly be rich in educational object-lessons for those in attendance at the meeting. Information in reference to this exhibit may be obtained by addressing Dr. Wm. P. Cooke, secretary of the committee, No. 100 Boylston street, Boston.

THE "DENTAL MIRROR."

A NEW candidate for the suffrages of the profession has appeared in the field of dental literature, entitled the *Dental Mirror*. It is a modest quarto of some sixteen pages, with promise of additions as its success shall determine. It presents quite an interesting mélange, consisting of a leading paper, editorials, short paragraphs of "chat," answers to correspondents, etc. Its special feature, however, is its department of "Statistics on methods of practice obtained by special correspondence." It is edited by Rodrigues Ottolengui, M.D.S., and published monthly by the Dental Publishing Company, No. 63 West Fifty-fifth street, New York. Its price is one dollar per annum.

BIBLIOGRAPHICAL.

ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES. A Yearly Report of the Progress of the General Sanitary Sciences throughout the World. Edited by CHARLES E. SAJOUS, M.D., and seventy Associate Editors, assisted by over two hundred Corresponding Editors, Collaborators, and Correspondents. Illustrated with Chromo-lithographs, Engravings, and Maps. Royal octavo, Volumes I–V, 1890. F. A. Davis, publisher, Philadelphia, New York, Chicago, Atlanta, and London. Price per set, cloth, $15.00; half Russia, $20.00.

Ths object and scope of this work have been explained in the notices of the two previous annual issues, and hearty commendation was given as to the manner in which the editor-in-chief and his assistants had performed their truly immense work. However high praise was merited and accorded to the series referred to, a still heartier commendation is compelled by this third issue of the Annual. It is really an extraordinary condensation of the progress of every branch of medicine during the year.

The sections of most interest to dentists are those on the diseases of the digestive organs in children, including the various forms of stomatitis, abnormal dentition, etc., by Dr. L. Emmett Holt; on oral and facial surgery, by Dr. Rudolph Matas; and on anesthetics, by Drs. J. M. Barton and Lawrence Wolff.

Each volume has a full index, and Volume V a general index of the five volumes, which is a marvel of thoroughness and compactness. It occupies one hundred and four pages, and was prepared by Dr. C. Sumner Witherstine.

DENTAL SURGERY FOR MEDICAL PRACTITIONERS AND STUDENTS OF MEDICINE. By A. W. BARRETT, M.B. (Lond.), M.R.C.S., L.D.S.E., Dental Surgeon to the London Hospital, etc. Second edition, with illustrations. Large 12mo, pp. 136. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $1.25.

Upon the first appearance of this little work we took occasion to cordially commend it, and since it has reached the second edition, which is a practical proof of its utility, we feel justified in counseling every medical practitioner and student to obtain this compact and concise statement of such foundation facts of dental practice as are indispensable to the proper equipment of the modern physician or surgeon.

PRACTICAL SANITARY AND ECONOMIC COOKING, adapted to Persons of Moderate and Small Means. By Mrs. MARY HINMAN ABEL. The Lomb Prize Essay. Inscription: "The five food principles, illustrated by practical recipes." Large 12mo, pp. 190. Published by the American Public Health Association, Rochester, N. Y., 1890. Price, cloth, 40 cents; paper, 35 cents.

This is a practical sanitary and economic cook-book, the object of which is to make clear to the ordinary housekeeper the fundamental principles for the proper preparation of food,—a working manual for the kitchen. It presents in an intelligent and intelligible manner the scientific grouping of the fundamental food principles.

The work contains a great amount of valuable information, and should have a wide distribution.

PAMPHLETS RECEIVED.

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Quackery: American, Anglo-American, and Quackery in all its various forms, as it appears in the Medical and Dental Professions at the present time. Read before the Central Counties Branch of the British Dental Association, at Birmingham, March 20, 1890, by the president, R. F. H. King, L.D.D., R.C.S. Eng. London: John Bale & Sons, 1890.

Bureau of Education, Circulars of Information: History of Education in Alabama, 1702–1889, by Willis G. Clark. . . . The History of Federal and State Aid to Higher Education in the United States, by Frank W. Blackmar, Ph.D. . . . English-Eskimo and Eskimo-English Vocabularies, compiled by Ensign Roger Wells, Jr., U.S.N., and Interpreter John W. Kelly, preceded by Ethnographical Memoranda concerning the Arctic Eskimos in Alaska and Siberia. Washington: Government Printing Office, 1890.

Oral Deformities and their Correction. By Kasson C. Gibson, New York, N. Y. Reprinted from the *International Dental Journal* for July, 1890. Philadelphia, 1890.

Prosthetic Hygiene. By Professor J. Hall Lewis, D.D.S., of Washington, D.C. Read before the Washington City Dental Society, March 18, 1890. Washington: Robert S. Cooper, printer, 1890.

Memorandum and Articles of Association of the Dental Association of Victoria. Melbourne: McCarron, Bird & Co., printers, 1889.

DENTAL LEGISLATION.

VIRGINIA'S AMENDED DENTAL LAW.

THE amended law of the State of Virginia regulating the practice of dentistry is printed below, the amendments being in italic:

SECTION 1767. From and after the passage of this act it shall be unlawful for any person to engage in the practice of dentistry in *the Commonwealth of Virginia, or to assist in the practice of dentistry as either assistant or employee*, or to receive license from any commissioner of revenue, unless such person has graduated and received a diploma from the faculty of a reputable institution where this specialty is taught, and chartered under the authority of some one of the United States, or of a foreign government, *acknowledged as such, and* shall have obtained a certificate from the board of examiners duly appointed under the provisions of *section one thousand seven hundred and sixty-eight of Code of eighteen hundred and eighty-seven*, to issue such certificates; provided, *that persons who shall be engaged in the practice of dentistry in the Commonwealth of Virginia on the first day of January, eighteen hundred and ninety, and who shall comply with the requirements of section one thousand seven hundred and seventy-four of this act shall be otherwise exempt from the provisions of this section; and provided further, that nothing contained in this section shall prevent a student who is pursuing a regular course of instruction from assisting a person in the practice of dentistry qualified as herein provided*, or shall prevent any *authorized physician or surgeon* from extracting teeth for any one suffering from toothache.

SEC. 1768. The board of examiners shall consist of six practitioners of dentistry, of acknowledged ability in the profession, to be appointed by the governor. The board shall continue to be divided into three classes with two members each, one of which classes shall go out of office each succeeding year; and the governor shall annually appoint the successors of each class, as it goes out, for the term of three years. He shall make the appointments in each case from four persons who shall be nominated by the Virginia State Dental Association, and reside in different sections of the State. All vacancies for unexpired terms shall be filled by the governor on nominations made by the board. If no nominations be made by the said association or board, as the case may be, or the nominations made be not approved by the governor, he shall appoint such persons as he may deem fit.

SEC. 1769. It shall be the duty of this board—

First. To meet annually at the time and place of meeting of the Virginia State Dental Association, or at such other time and place as the board shall agree upon, to conduct the examination of applicants. They shall also meet for the same purpose at the call of any four members of the board, at such time and place as may be designated by said members. Thirty days' notice of the meetings shall be given by advertising in at least two of the daily papers published in the State.

Second. To grant a certificate of ability to practice dentistry to all applicants who undergo a satisfactory examination, and receive at least four affirmative votes; which certificate shall be signed by the members of the board, and be stamped with a suitable seal (which they may adopt).

Third. To keep a book in which shall be registered the name and qualification (as far as practicable) of every person to whom such certificate is granted.

SEC. 1770. The book so kept shall be a book of record, and transcripts from it, certified by the officer who has it in keeping, with the seal of the board affixed, shall be evidence in any court of this State.

SEC. 1771. Four members of the board shall constitute a quorum; and should a quorum not be present on any day appointed for their meeting, those present may adjourn from time to time until a quorum be present.

SEC. 1772. Any person who shall, in violation of this chapter, practice dentistry in this State, shall, on conviction thereof, be fined not less than fifty nor more than two hundred dollars, and shall not be entitled to any fee for service rendered; and if a fee shall have been paid, the patient may recover back the same.

SEC. 1773. All fines collected under this chapter shall go to the public school fund of the county or corporation in which the prosecution is had.

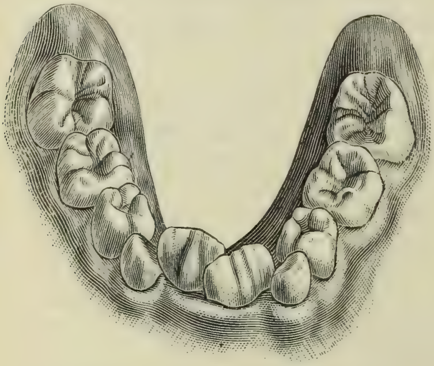
SEC. 1774. *Every person practicing dentistry in the Commonwealth of Virginia, at the time of the passage of this act, shall register his name and post-office address, together with the name of the college from which he is a graduate, or the length of time he has been practicing in this Commonwealth, with the board of examiners before renewing his license, and it shall be the duty of the board to issue to each person so registering a certificate of registration stamped with the seal of the board, but no fee shall be collected by the board from persons so registering.*

SEC. 1775. To provide a fund to carry out the provisions of section seventeen hundred and sixty-nine, it shall be the duty of the said board to collect from those who appear before them for examination the sum of ten dollars each.

The law was approved January 28, 1890.

HINTS AND QUERIES.

To Control Occlusion.—In the "Hints and Queries" department of the August Dental Cosmos G. M. M. asks for the best method of securing an accurate occlusion. I believe that it is best to say nothing to the patient that will give any idea of the object in view, and then he will make no effort to aid in the operation. After placing the wax in position, ask some irrelevant question, and as the patient endeavors to reply observe the movements of the jaw ; the instant the mouth is closed in the endeavor to swallow, place the hand under the chin and press hard enough to get the proper imprint of the teeth. For a full set, hold the chin firmly, as before said, and make the median-line mark and the usual side-marks on both pieces to indicate their proper relations when removed. Above all things, never tell patients to "bite naturally" ; under the circumstances they cannot do it.—Fred. M. Wetherbee, D.D.S., Milford, N. H.



Geminated Lower Incisors.—The cut clearly shows the curious anomaly of the gemination of the crowns of both the lower centrals and laterals, which resemble in appearance two upper centrals, and might easily be supposed to be such transplanted into the lower jaw but for the rib-like elevation on the faces of the teeth along the line of union. The question as to the like blending of the roots may some day be solved, since the subject is the son of a dentist.—X.

Ether Spray for the Obtunding of Sensitive Dentine.—In the Dental Cosmos for June, in a paper read by Dr. M. L. Rhein, the following language occurs : "We may therefore say that Dr. R. Ottolengui is entitled to the credit of introducing the use of the ether spray for the purpose under consideration." The purpose referred to was the obtunding of sensitive dentine.

Permit me to call attention to a book entitled "Dental Materia Medica," published by S. S. White in 1868, and modestly professing to have been "*compiled* by James W. White." On page 106, in a chapter on "Local Anesthesia," I read as follows : "To obtund sensitive dentine, throw the spray directly into the carious cavity, taking the precaution to cover that portion of the tissue over the pulp with some non-conducting material. Some operators fill the cavity with cotton and direct the spray upon that. The benumbing effect being only temporary, an occasional repetition of the spray will be required until the excavation is completed." In the chapter referred to the spray-producing apparatus is illustrated and described, and ether, rhigolene, and a mixture of the two are named as the agents employed.

The writer still owns the copy of this valuable little work obtained at the time of publication, and of which he was informed that a very large edition had been disposed of.

This affords another instance of the rediscovery of old methods.—W. H.

Filling of Difficult Root-Canals.—Though reports of conventions are replete with theses and discussions on root-filling, and magazines grant much space to "original articles" on the same topic, but few suggestions of practical value have yet been offered in connection with that most tedious, most uncertain, very important, and most often neglected operation, viz: the filling of *remote*, *narrow*, and *tortuous* root-canals.

A means that would render facile and thorough the filling of buccal roots of superior molars, and anterior canals of inferior multicuspids, has hardly been offered the profession. These narrow passages, then, are the ones that demand our special efforts and attention.

I have been making a perfectly tapered, cone-shaped point of a metal possessing the following requisite qualities: It is dense, tenacious, sufficiently stiff and pliable. It can be attenuated to a remarkably fine degree, and still be rigid enough not to curl upon itself, if perchance you should miss the entrance to the canal in its introduction. So pliable is it that it will readily follow any curve in its passage. So finely can it be attenuated, that there are very few of the large proportion of so-called difficult canals but can be easily entered and coursed.

For canals too fine for thorough cleansing, dip the point into chloride of zinc and gently crowd into position. Canals with better opportunities are first pumped full of chloro-percha, the point dipped into the same and introduced. In narrow, flat canals place two or three side by side, making it a consideration always to choose a point too small rather than one too large. The amount of chloro-percha which is crowded forward and into the remaining lateral space is so minute as not to have its shrinkage be of consequence. I introduce a point, holding it with pliers. To crowd the same to its place, however, I use a large-faced, sharply-serrated amalgam plugger, with point bent at a right angle, at a distance of three-eighths of an inch from the serration. This is the simple method. The *results* are, evidently, great saving of time and nerve-force; unqualified and positive filling of root-canals left heretofore in questionable condition,—left as probable agents of future periostitis, however slight, possible abscess, or even occasional loss of a tooth.

The metal spoken of is copper, and the point can be used either as a pure copper cone or purchased electro-gold-plated. To objections offered to metal cones, such as liability of forcing through the foramen, incompatibility, etc., there can be but one reply. Observe nearly the same care in introducing the cone as is advisable in the use of a pulp-bristle or broach, and your apprehension will prove groundless. Your fine sense of touch, too, will be your guide; or, should the apical foramen be very large, proceed with judgment, necessary always in such cases.

The claim that pathological conditions would arise from the free use of copper in the roots of teeth is an unwarranted presumption. I have frequently demonstrated its fallacy, by repeated and sustained experiments in my laboratory and at the chair, and consider simple denial of the proposition sufficient at this time.

The readily accomplished removal of these gold-plated and copper points, in the opening up of troublesome roots, is a feature of importance enough to demand kindly consideration of the profession. There are few operations more trying to patient and dentist than the tedious drilling and picking out of a root-filling when peridental inflammation has rendered the tooth excruciatingly painful to the touch and a generally irritated condition has largely robbed the patient of self-control.

Hand in hand go *facility* and *thoroughness.* It is with this inscription that I commend to the profession copper canal-points.—CARL T. GRAMM, Keokuk, Ia.

AMALGAM TESTS.—These are commonly made to determine whether or not the amalgam contracts, keeps its color, has edge strength, takes mercury in large or small proportions, and sets quickly or slowly. The tests are made out of the mouth, in strong matrices, at varying temperatures below 80° F., but are not subjected to sudden changes of temperature as by submersion in hot or cold fluids. The artificial are so dissimilar to the natural conditions that the out-of-the-mouth tests are very misleading. In the first place, it is assumed that an amalgam suitable for filling teeth should not contract at any period of time during the process of setting, or hardening, or crystallizing, whichever term may be used to express the fact of final solidification. The assumption is not well founded, because the tooth and the amalgam differ widely in responsive contraction or expansion when subjected to alternations of heat and cold. The mass of amalgam is frequently greater than that of the filled tooth-crown ; and when such a tooth in the mouth is filled with an amalgam which is deemed non-contracting, it is common for the patient to subsequently report or show the loss of a portion of the thin enamel-wall of the crown, and attribute to mastication what was really due to the expansion of the amalgam when hardening, or to its expansion by hot or cold food or drink.

Some amalgams expand during the first few hours after mixing, and then contract until quite hard. Others contract at first and subsequently expand, the great variety of alloys employed and the variable proportions of mercury in the mixtures, even of the same alloys, being the occasion of greatly differing amalgams. These, furthermore, vary in behavior between the times of mixing, insertion, and solidification. Uniformity of conditions and results seems unattainable, and true conservatism therefore points to the use of an amalgam which under extra-oral tests at the maintained temperature of 98° F. in the presence of moisture shows a very slight final contraction. The question of color can be fairly settled only by intra-oral tests for at least a year's time in different classes of mouths. Edge strength is also best tested in the naturally situated teeth, because the edges of the fillings are modified by the shapes of the cavity borders, and by manipulation in the process of filling, which under the hands of most operators is overdone, and the filling therefore fails in the edge strength that an amalgam would have if quickly packed and allowed to quietly harden for finishing after two or three days.

With regard to the proportion of mercury to alloy, the matter of temperature has much to do, and for either extra or intra-oral tests the materials and mixing apparatus should be kept at the temperature of about 100° F., and the mixing and filling with warm instruments be an uninterrupted process to its quick completion, the preference being given to a moderately quick-setting amalgam of a fine-grained, plastic quality. Too great stress cannot be laid upon the vital necessity of finally and finely finishing every amalgam filling, the ultimate result being a permanently preserved tooth when proper practical tests have led to the selection of a suitable amalgam.—H. S. W.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

THE ORIGIN AND EVOLUTION OF THE FACE.

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(Concluded from page 690.)

WE turn now to the record of embryology, which is, in many respects, much more clear and continuous in the genetic evolution of the face than the comparative record. The latter is sadly mutilated and broken, so that only in a very few instances, as in the case of the horse, can the history of the development of a species be made out at all. Contemporaneous species give us an analogical history only, but we can judge from them what the evolutionary history of man must have been like. That far we are positive, however, for the assumption is borne out by the history of the few species in which the record is complete, and we must reason from analogy that those whose record is incomplete must have had a similar history of evolution and development. Man is, unfortunately, one of the species in which the record is most incomplete ; but judging from analogy, we necessarily infer that he must have had a similar process of evolution. From this induction there is no escape.

But to his animal organization there is superadded the conspicuous peculiarity of a high intellectual growth which is absolutely unique, and which sets him apart in a great department of his own. No other animal approaches him in regard to mass of brain or mental power. The history of the development of this remarkable faculty is entirely lost, for we are as yet in total ignorance of the barest hint of the process by which it arose. We are not convinced that it could have been developed from an ordinary animal intelligence, for the mind of man has many qualities which set it apart and distinct from the animal mind. It is these qualities of mind and the victories over nature, and great achievements by reason of these qualities, which distinguish man from the mere animal. It does not seem possible that they could have been developed from the animal mind, so far as we know the latter by its phenomena; but as we know it *only* by its phenomena and cannot become *en rapport* with it, we cannot judge finally. We may yet be permitted to accept the final cause of a supernatural interference in the process of the creation of the human mind as a distinct and peculiar endowment of our species, which cannot be accounted for by the natural processes with which we are acquainted.

Be the source what it may, the human mind is a powerful factor in influencing the evolution of the face, and to this is due the high development of that area of the human body as an expressional organ. We have noticed this at length in our previous studies. The influence of the mind upon the face in the individual is, however, mainly post-natal; for whatever this may be in utero is probably only hereditary, with, perhaps, some occasional effect from transient maternal emotion. Without stopping to dwell upon this, we pass now to the study of the evolution of the face from the embryological aspect, in addition to its anatomical history from the comparative stand-point. This will lead us to a better understanding of the unfoldings and unfoldings, through past germinal forms, through which the human face has come, up to the perfect flower of to-day!

We notice at the outset that the subject of the embryological history of man is greatly misapprehended, although, as we have noticed before, it is simple in its principles when studied from the evolutionary and comparative stand-point. We have been a long time in accepting the self-evident fact that the human embryo passes through stages of growth that recall and illustrate the growth of the species, for the growth of the embryo is, in fact, an epitome, a panorama in miniature, of the growth of the species. It presents, at various and successive steps, conditions and parts which are permanent in lower animals. At first it resembles the very lowest forms, then those next higher, then those still higher, and then again higher, until its own type is reached, when its form, in turn, becomes permanent. Its growth simply illustrates the growth of the species, and by graded stages of resemblances points out the path by which its own type was reached in the evolution of the species. But simple as this fact is, it remained unrecognized for long years, and is, indeed, understood by but few intelligent people even now. Prof. Ernst Haeckel, in "Evolution of Man," writes at length of Anthropogeny, as the evolution of man is christened. "It is surprising," he says, "to see what a little way the knowledge of human evolution has spread even among the very students of nature." Or again ("History of Creation''), ''The facts of embryology would alone be sufficient to solve the question of man's position in nature, which is the highest of all problems, for their philosophical importance cannot be too highly estimated. But then what do our so-called 'educated' circles, who think so much of the high civilization of the nineteenth century, know of these facts or understand of their own organism? What do speculative philosophers, or indeed the majority of naturalists, know of them? We must confess with shame that these invaluable facts of human ontogeny are utterly unknown to most people, or are not valued as they deserve to be.'' He proceeds to explain this important branch of science, and begins:

''Our first principle of biogeny is, the evolution of the germ is a condensed evolution of the tribe, and the reproduction is more complete in proportion as, in consequence of constant heredity, the original inherited evolution is more closely realized.''

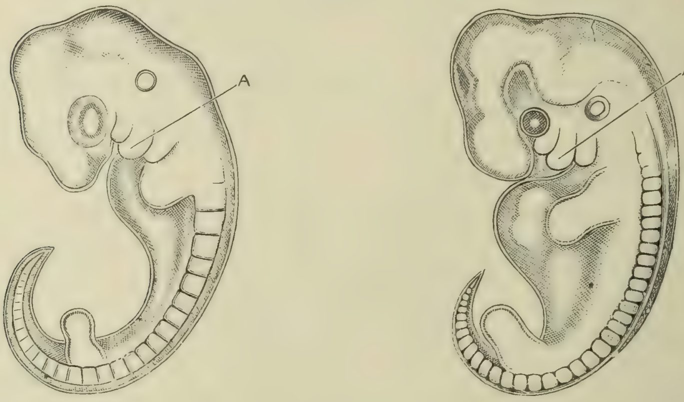
Haeckel again says (''Evolution of Man''), ''At a certain period in the development of the human embryo it has essentially the anatomical structure of a lancelet, later of a fish, and in subsequent stages of amphibian and mammal forms; in the further evolution of these mammal forms those first appear which stood lowest in the series, such as the forms allied to the beaked animals (ornithorhynchus); then those allied to the pouched animals (marsupialia), which are followed by forms most resembling apes, till at last the peculiar human form is produced as the final result.''

He gives at length the steps in the growth and development of the human embryo, from which we select his description of those which bear upon the origin and evolution of the face.

He says (''Evolution of Man''), ''In man, as in all other higher vertebrates, the following incidents of germ history must be regarded as *paligenetic* processes (*i.e.*, reproduction of the history of the germ),—the formation of the two primary germ layers, the appearance of a simple notochord between the spinal tube and the intestinal tube, the transitory formation of gill-arches and gill-openings, of primitive kidneys, of the primitive brain-bladders, hermaphrodite rudiments of sexual organs, etc. All these and many other important phenomena have evidently been accurately handed down, by constant heredity, from the primeval ancestors of mammals.'' . . .

Haeckel, in ''History of Creation,'' again says, ''In all craniota, that is, all vertebrate animals having a skull and brain, the brain, which is at first only the bladder-shaped dilations of the spinal marrow, divides into five bladders lying one behind the other. This is just the same in all vertebrate embryos,—from the lowest to the highest. The whole form of the body is as yet exceedingly simple, being merely a thin, leaf-like disk. Face, legs, intestines, etc., are completely wanting, but the five bladders are quite distinct. The *first* bladder, the fore-brain, develops into the hemispheres of the large brain, the cerebrum. The *second* forms the center of sight," etc. . . . "An exceedingly important formation, of which we are not able to recognize a trace in the full-grown animal, are the *gill arches*, which originally are common to all vertebrate animals, but which at a later period are transformed into the most different organs. Everyone knows the gill-arches of fish, those arched bones which lie behind one another to the number of three or four, on each side of the neck, and which support the gills, the respiratory organs of the fish. Now, these gill-arches originally exist in embryo exactly the same in man, in dogs, in fowls, in tortoises, as well as in other vertebrate animals. (See Fig. 1.) It is only in fishes that these remain in their original form and develop into respiratory organs. In the other vertebrate animals they are partly employed in the formation of the face (especially the jaw apparatus) and partly in the formation of the organ of hearing."

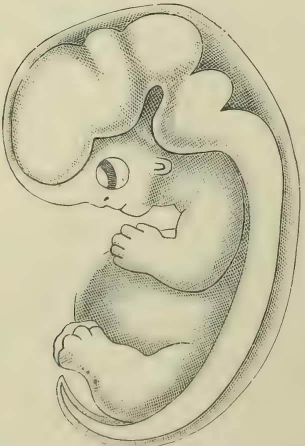
FIG. 1.



Tortoise. Man.

EMBRYOS AT FOURTH WEEK, SHOWING GILL-ARCHES (A).

FIG. 2.



EMBRYO OF MAN AT EIGHTH WEEK.

"An examination of the human embryo in the third or fourth week of its existence shows it to be altogether different from the fully developed man, and that it exactly corresponds to the undeveloped embryo form presented by the ape, dog, rabbit, or other mammals at the same stage of their ontogeny. At this stage it is a bean-shaped body of very simple structure, with a tail behind and two pairs of paddles, resembling the fins of a fish. Nearly the whole of the front half of the body consists of a shapeless bud without a face, on the sides of which are several gill-fissures and gill-arches as in fishes. . . . In the embryo of man, as in all other vertebrates, the very remarkable and important structures which are called the gill-arches and gill-openings appear at a very early period, on each side of the head. These are among the characteristic and never-failing organs of vertebrates. . . . The number of these gill-arches and of the gill-openings between amounts in the higher vertebrates to four or five on each side ; but the lower forms have a yet larger number. Originally they are used for respiration. In the higher vertebrates they afterward close, and are transformed partly into the jaws and partly into the bonelets of the ear. Almost simultaneously with the development of the gill-arches and immediately behind these, the heart with its four compartments is formed, and above, on the side of the head, the rudiments of the higher sense-organs appear,—the nose, eye and ear. These highly important organs originate in the very simplest forms. The organ of smell appears quite in front of the head in the shape of two little pits above the mouth-opening. The organ of sight, also in the form of a pit, comes next behind the organ of smell, toward which a considerable vesicular outgrowth of the fore-brain grows on both sides of the head. Farther back appears a third slit on each side of the head,—the first rudiment of the organ of hearing." Or again, "At a very early stage, and while no trace of the characteristic facial structure of man is yet visible, a pair of small grooves appear before the primitive mouth-cavity, the primitive nasal grooves. They are separate from the mouth-cavity, which also makes its appearance as a groove-like indentation of the external skin, opening in front of the blind anterior extremity of the intestinal canal. This pair of nasal grooves, as well as the single mouth-groove, are lined by the external epidermis. The two inner nasal processes or flaps arise right and left of the grooves, and opposite to these rises another groove between the eye and nasal grooves. A plug-shaped formation projects into the nasal grooves, which is the upper-jaw process. Below the mouth-groove lie the gill-arches. The first of these develops into the jaw skeleton of the mouth, and is called the jaw arch. A small process first grows out from the base of the first gill-arch ; this is the upper-jaw process, which forms the principal part of the framework of the upper jaw. On its outer side the bone afterward unites, and in the middle portion the intermaxillary develops for the anterior portion of the frontal process. . . . The external nose is not developed until long after all the internal parts of the sense-organ have been formed. It appears at the end of the second month and grows out to form the process, but the form characteristic of man does not appear until a far later period. In most forms the nose retains an undeveloped form. . . . The outer protective parts of the eye are merely simple folds of the skin which appear in the third month. The inner parts originate from the inner structures of the head. . . . The entrance to the intestinal canal is the mouth-opening, which is part of the intestinal system, and receives the food which it passes on to the digestive organs. The external opening originates in a fold or groove-like incision of the external skin, and its membrane is formed from the skin. . . . The original formation of the mouth-skeleton, the upper and lower jaws, is traceable to the gill-arches."

From these remarkable beginnings there is developed the human face with all its superadded powers of expression and physical beauty. The first crude and immature form as seen at birth, with all its future possibilities, is produced by evolution along the same path which leads to the development of the same parts in other animals, as already noted. The resemblance to lower forms is maintained to the last stage, the last animal resemblance to disappear in the face of the human embryo being that of the apes. The face of the newly-born infant bears a strong likeness to the immature faces of the quadrumana, and an occasional very low face in a child is almost painful in its resemblance. When shrunken by disease or innutrition from any cause, the infantile face shows but too plainly the evidence of its descent. It simply becomes immature again by retrogression along the path of its development, and advances again on regaining health and vigor, and goes on its course of human development. Many coarse faces retain their animal character even to maturity, because some of the features are immature. But of this we will have occasion to speak again.

We have now studied the origin and followed the evolution of the face by various paths. Surely the little evidence we have here gleaned from the great field of nature is of itself convincing that the face of man has arrived at its present perfection not by accident, not by one stroke of creative power, but by the simple, philosophical, and natural methods of gradual development.

Let us briefly recapitulate and sum up the evidence adduced :

1. Every individual animal body has become what it now is by a gradual process. As the individual grows, so has the species grown. Evolution applies to all and explains all.

2. Although the line of descent is from the lowest to the highest forms, the record is not always continuous, and the path of the evolu-

tion of man is especially difficult to follow. Yet we know by analogy that he followed the same path as other animals in the process of development.

3. The structures of the face arose from its parts having been erected for the accommodation of some of the special sense-organs, and upon these foundations the facial features were constructed and facial expression became possible.

4. In our study of the evolution of the sense-organs and the structures which support them, we notice that the invertebrate animals have the special sense-organs scattered over the entire body, so that there is really no face, strictly so called, until we reach the vertebrates, where the four special senses are located within a limited area upon the front of the head. The supporting environments of the senses constitute the face in this class.

5. The study of the face in the lower vertebrates shows that there is little or no expression in those forms, although the eye becomes expressive very early in the scale ; but in the higher mammals the facial features gradually attain the power of expressing the emotions.

6. In the higher apes, as we should expect, the closest approach is made to man, and the face becomes all at once the special seat of expression. Man shows his relationship with this order in various features, but in no one species of apes is the resemblance to him very strong. This general resemblance indicates not direct, but collateral descent, and the face bears evidence of such descent.

7. Turning to the embryological record, we find that this is clearer and more connected and continuous than the comparative record, although they are both similar, and the one is but an epitome and recapitulation of the other.

8. The history of the origin and evolution of the face is most readily followed in the embryological record. The embryology of the face is elaborate, as its importance demands, and from it the final result of the human face develops with all its possibilities of beauty and psychological expression.

ROOT-CANAL FILLING.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

MODERN dental literature is replete with papers and discussions relating to the subject of teeth which by any means have become pulpless, and probably in no other department of operative dentistry are there more diversified modes of practice advocated than in the widely divergent methods and means brought forward for filling the root-canals of such teeth. The present purpose is, however, neither to discuss those processes in detail nor to add a radically different one to the number, but to simply lend emphasis to the facts that the work should be thoroughly done, and positively known to have been completely accomplished.

The canals in teeth-roots commonly conform somewhat closely to the outlines of their roots, and, taking into account the age of a patient, the size and form of a tooth-root may be approximately estimated by one familiar with the characteristics of the canals of teeth represented by the tooth-root under consideration. The pertinent point now in order is the ascertainment of the length of the canal between its pulp-chamber opening and the apical foramen ; or, if the crown be present, between its edge and the foramen. Usually the foramen is found at the apex of the root, and is indicated by a constriction of the canal at that point, but not infrequently the emergence is at the side of the root near the apex, and there are sometimes found several laterally opening foramina of very small diameter. Practically in cases of recent pulp removal the apex is indicated by the slight pain occasioned by the passage of the exploring probe through the foramen. When alveolar abscess has supervened, the pain test may be misleading, but as we are now considering the subject of filling the canal, it is presupposed that the canal will have been made ready for filling, and in such a case the abscess should have been eradicated, and a normal sensitiveness of the closely investing pericemental or cicatricial tissue should occasion a painful response to the prick of the probe.

The roots of bicuspids and molars are not seldom bent near their extremities, and their canals are therefore difficult of exploration, but, as is also the case with very small roots, and especially the buccal roots of molars, very thin spring-tempered probes can be made to reach the foramina of nearly all root-canals that have been properly prepared for filling. Whether or not narrow and tortuous canals should be enlarged with drills or reamers is a debatable question. The writer prefers to critically examine, study, and operate on the canals as they are found, for the reason that thus sounder and safer conclusions can be reached, and the risk of forcing drill-chips or débris into the apical region be avoided. It is, furthermore, apposite to say that a fine flexible explorer will go wherever the guide-point of a drill can lead the drill or reamer, and hence it is time lost to drill. With these preliminary considerations, the practical part of the operation will be described with reference to explanatory illustrations.

Fig. 1 represents a very thin spring-tempered steel wire probe, the round shank of which loosely enters the split socket of the chuck shown in Fig. 2. The milled nut of this chuck may then be turned between the thumb and finger to clamp the probe in its socket at whatever depth (to the extent of five-eighths of an inch) the probe-shank may be inserted. The chuck has a cone-socket shank which may be tightly screwed into any cone-socket handle, preferably a No. 1. Fig. 3 shows in section a pulpless superior incisor, into the canal of which a probe is pushed until slight pain indicates the passage of the probe barely through the foramen. The probe is then withdrawn one-sixteenth of an inch, and firmly fixed in the chuck so that the chuck end will stop against the end of the tooth when the end of the probe exactly reaches the foramen without passing through it. This is the prime point of the operation, and the chuck affords means for accurately measuring the length of the root-canal, and at the same time so securely holds the probe that it can be used as a properly-gauged plugger for filling the canal at its extremity without forcing the filling through the foramen. Fig. 4 exhibits a similar instance in point, and

FIG. 1.

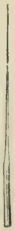


FIG. 2.

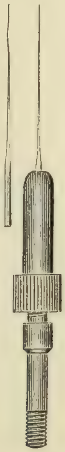


FIG. 3.

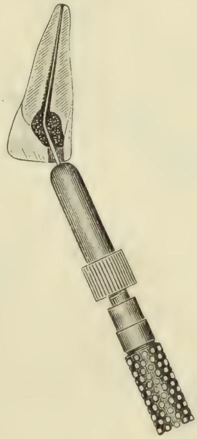


FIG. 4.

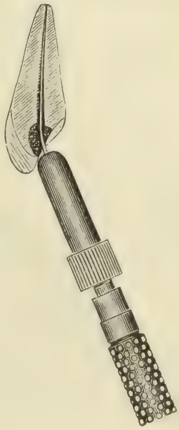


Fig. 5 shows a simple short root, the canal length of which is gauged by the probe while firmly yet adjustably fixed in the chuck, alongside of which is a duplicate probe to show the depth of the probe-shank in the chuck-socket. Still another example is given in Fig. 6, where the shank of the probe is bent to permit access to the mesial root of a lower second molar, or to a lower bicuspid at a different angle (Fig. 7). In these instances it is noticeable that the effect of the grip on the thin probe-shank at the nearest approachable point toward its end allows considerable operative force to be applied to the rigid chuck in order to the pushing of the probe for either the exploring or the filling of the canals.

In Fig. 8 is depicted the root-canal of a cuspid root, the extremity of which extends at nearly a right angle to the body of the root, and yet the fine flexible probe will, as shown, follow the curve of the canal to the apex with the certainty of not passing beyond it. So likewise will it in the case of the curved buccal roots of the upper molar shown in Fig. 9. In each instance the illustration is made from a section of a natural tooth.

The great variation in the length, diameter, direction, and situation of root-canals renders it necessary that there shall be a corresponding variety of plugger-probes adapted to meet the requirements of successful practice, for it is more than probable that failures have frequently followed attempts to perform the operation with but a few instruments suited only to the coarser class of cases.

More and more, month by month, is it coming to be seen that the dental specialist requires special instruments and appliances especially adapted for use upon and in organs which, while resistant and rigid in structure, are extremely variant in size and form, and often accessible only to the operator of tried patience and skill who has duly provided himself with every attainable specially adapted instrument and appliance within the resources of his calling. To the dentist of this class the following described series of canal-probes and pluggers will not seem redundant, although the finest forms are too thin for illustrative representation; in fact, their minuteness is such that not only is their construction a matter of difficulty for expert workmen, but their differentiation to the unaided eye requires them to be distinguished by suitable recesses in which each probe of the series has its numbered place. When removed for use, it is to be replaced by finding the recess or indentation which it alone exactly fits. To these is added a dresser-probe, the magnified representation of which (Fig. 10) exhibits also the general form of the other instruments, which are ovoid in cross-section as shown at *b*, and taper to a nearly square cut-off end as at *a*. This typical shape conforms nearly to the figure of most canals, and permits the greatest degree of stiffness consonant with the required degree of flexibility in the instruments. It also en-

FIG. 5.

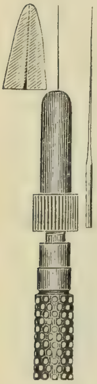


FIG. 6.

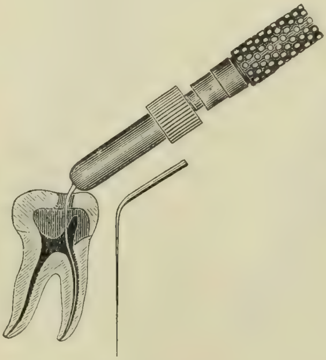
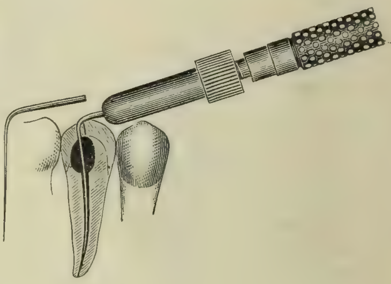


FIG. 7.



ables the operator to readily twirl upon it a few fibers of absorbent cotton for removing moisture from the canal, or for inserting medicaments or dressings. The dresser (which is designated by the letter A to distinguish it from the numbered steel instruments) is made of iridio-platinum, and is therefore non-corrodible by water or acids. By holding between the left thumb and finger a very few fibers of cotton, and pinching upon them the dresser while the chuck-handle is rapidly twirled between the right thumb and finger, and then gripping the tightly-wound cocoon to merely start it loose on the dresser, it may be dipped in creasote or any medicament, carried into the canal, and left there as a tubular dressing, which while medicating will also drain a discharging abscess, and so serve as a temporary application without risk of the swelling and pain caused by a complete stoppage of the outflow. By the same means tubular tents may be placed in any sinus or pocket. It is an advantage thus to be able to avoid wetting with the risk of rusting the polished steel probes, which when unavoidably wet should at once be wiped dry. It is furthermore of much importance that all moisture be taken from the apical portion of the canal prior to gauging its length, else in a very narrow canal the probe will fill it nearly like a piston and force the little column of fluid ahead of it, with the effect of giving pain as if a solid substance had gone through the foramen, thus causing the gauge to be set short of the apex. The same misleading effect often follows the extraction of a pulp which may be seen to have been wholly removed, but upon beginning to dry out the canal with a cotton-wrapped dresser, it will

FIG. 8.

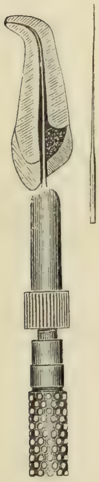


FIG. 9.

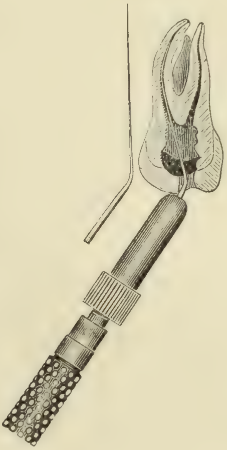


FIG. 10.

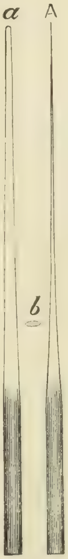


FIG. 11.

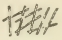
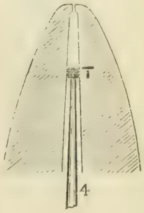


FIG. 12.



act as a piston, and cause, as before said, a twinge of pain as if all of the pulp had not been brought away. When, however, the blood or other fluid has been quite removed by successive cocoons of so few fibers that they scarcely cover the fine end of the dresser, the canal will be found empty, and sensation will be induced only by the passage of the point through the foramen.

For filling the canals, shreds of tin foil are prepared by taking a half-sheet of foil, cutting into its end for an inch or two every quarter of an inch, and then with the sheet held by the thumb in the left hand and the ends of the foil-strips lying on the foil-shears blade which rest across the left-hand fingers, very fine shreds of tin are clipped from the strips' ends until the first set of strips are quite cut up. The process is then repeated until the sheet can no longer be held to be cut. A mass of short, fine shreds may thus be quickly made and placed in a box for use.

When everything is in readiness, a bunch of tin shreds (Fig. 11) is picked up with the foil-pliers and carried into the pulp-chamber. By successive careful thrusts of the gauged plugger, one shred after another will be pushed into the canal, and by reason of its tapering walls be compacted into a little plug at a point somewhat beyond midway of the canal (Fig. 12). The gathering of the shreds to form this plug of a closely estimated thickness (T, Fig. 12) is a matter of prime importance, and requires experience and skill for its accurate accomplishment. Practice upon extracted teeth or roots that may be filed away at their sides near the apices to show how nearly the plugs have been carried to the foramina, will prove both instructive and satisfactory. A considerable degree of push on the plugger (4, Fig. 12) will be required to carry the plug T to its seat at T, Fig. 14, and the fact of arrival there may be certainly known by the stoppage of the chuck end at about a thirty-second of an inch short of the tooth (Fig. 13) or root-end. Another like plug may be then packed upon the first, and the remainder of the canal filled with any metal or plastic that may be preferred. It is, however, not essential that more should be done than to tightly seal the foramen with tin, as at Fig. 14, for success is then surely secured; but it is requisite that tin should be used, because gold is liable to become so solid at T, Fig. 12, that it can be pushed but little farther, and lead will be perforated by the plugger, whereas tin becomes hard enough to resist penetration, yet is sufficiently compressible to be adapted to the converging walls of the canal as the plug is pushed to its seat. Even when the foramen is enlarged, as in Fig. 15, the gauged plugger will permit a tin plug, T, to be carried exactly to the apex as shown. The normal taper of the root-canal is thus seen to be an important factor in the described operation, and the fact is an additional reason for the avoidance of drilling or reaming the canal at the outset ; either may, however, if desirable, be safely done after the sealing of the foramen with tin.

The series of plugger-probes consists of nine, and they are graded in groups of three. The first numbers, 1, 2, 3, are of equal delicacy near their ends, but differ in length of blades to afford more or less stiffness according as the narrow canal may be short or long. Numbers 4, 5, 6, are likewise proportioned, but are not so slender. Numbers 7, 8, 9, are similarly graded, and of slightly increased dimensions in the blades, which in each number are cut nearly square off to enable them to carry and pack the shreds of tin foil. To meet cases requiring shorter and thicker plugger-points, the operator can readily make such out of suitable steel wire.

FIG. 13.

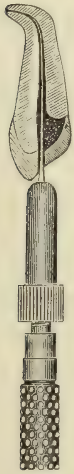


FIG. 14.

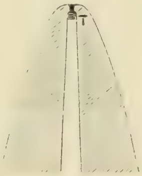


FIG. 15.

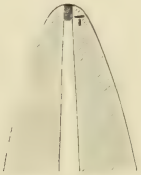
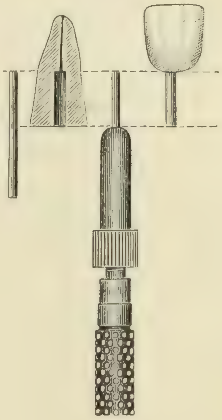


FIG. 16.



The chuck will prove otherwise useful, as, for example, in gauging the depth of a post-hole in a root, Fig. 16, which shows beside the root a piece of wire that when fixed in the chuck will determine the proper length of the crown post. It will also hold firmly the small shanks of the well-known barbed bristles for removing devitalized pulps. Dr. C. F. Allan originally suggested the idea of an iridio-platinum canal-dresser soldered to a suitable holder, but that herein shown, magnified, in Fig. 10, is adapted to be adjusted and gauged by means of the firmly-gripping chuck.

An experience of more than a quarter of a century in the successful practice of the positive method of filling root-canals with tin foil to their very apices measurably certifies the practicability of the process, and is sufficient justification for this presentation of an improved mode of procedure.

DENTAL ANALYTICS.

BY CHAS. MAYR, A.M., B.S., SPRINGFIELD, MASS.

THE number of chemicals used in the ordinary course of practice by dentists is not large, but just because of their small number it is very important to know that they are good. The most important nowadays are carbolic acid, aromatic sulphuric acid, a solution of bichloride of mercury, and hydrogen peroxide. Of these, the first two are usually purchased in standard strength and do not alter materially by standing; but the last two are very liable to, and actually do, undergo considerable changes.

The solution of bichloride of mercury which is usually applied in the strength of 1 to 500, or 1 to 1000, may be considered a very dilute solution; under the influence of sunlight the mercury is slowly reduced by the organic substances in the water, and a whitish precipitate of calomel is the result. As the calomel is inert for the purposes of a dentist, the solution has become so much weaker; and if the water used is very rich in organic matters or iron salts, a solution of 1 to 1000 may lose all its soluble mercury and become actually inert.

A dentist is usually too busy to make a complex test to see whether his solution of bichloride of mercury is still reliable or not. If he were inclined to make such a test, a very good one would be the addition to the solution of $HgCl_2$ of a fresh solution of sulphuretted hydrogen in water. A solution 1 to 500 turns black, and deposits a measurable amount of mercuric sulphide. A solution of 1 to 1000 becomes dark brown, but the deposit is slow in settling. Even solutions of 1 to 500,000 are still slightly colored brown by this reagent.

Another fair test is iodide of potash. It precipitates in a solution of 1 to 500 the scarlet red iodide of mercury. More dilute solutions do not give reliable tests with this compound.

Besides, all these tests with solutions require a considerable amount of the solution to be tested. I have tried to obviate that objection and to contrive a method by which such solutions can be tested, even roughly, quantitatively, with a simple drop.

For this purpose I saturate a nice grade of paper with a solution of a given amount of iodide of potash in water; with the proper gauging of this solution, after it has dried on the paper, a drop of the solution of bichloride of mercury (1 to 500) will produce a scarlet spot when dropped on the paper; a solution of 1 to 1000, a yellow spot; a more dilute solution, no spot at all. To obtain this result, a certain strength of the solution of iodide of potash gauged for the paper to be used is required. As the iodide of potash paper is apt to undergo slight changes when exposed to the atmosphere, due to the liberation of free iodine, it is desirable to make the solution of iodide of potash slightly alkaline, which would prevent, to a great extent, the paper from turning blue.

Another important compound much used of late by dentists is hydrogen peroxide. I need not enter into the manner of making it, and what it is. Suffice it to say that the standard grade in the market ought to contain not less than twelve volumes of oxygen. This "twelve volumes of oxygen" means that on boiling one ounce of hydrogen peroxide it ought to give off twelve fluidounces of oxygen. Even with this twelve volumes of oxygen, the quantity of pure H_2O_2 in solution is quite small, only about 2.8 per cent. By keeping, oxygen is slowly given off, and I have found that in the course of half a year a solution which started with twelve volumes of oxygen contained only five volumes.

As the volume test for oxygen is complicated and cannot well be performed by a busy dentist, some simple tests are desirable by which with one drop a dentist may tell approximately the strength of his hydrogen peroxide.

I have found that a paper saturated with a mixed solution of iodide of potash and dithionate of soda answers the purpose. The hydrogen peroxide liberates the iodine in the iodide of potash, but this liberated iodine is immediately seized by the dithionate of soda, and a colorless solution is the result. But if enough hydrogen peroxide is applied, the blue spot will appear, because more iodine is liberated than can be used in oxidizing the dithionate of soda to tetrathionate of soda. Thus the problem of such a test-paper resolves itself to a proper proportion between iodide of potash and dithionate of soda ; to make the reaction more pronounced still, a little starch-paste is added.

I have thus succeeded in producing a paper which, with one drop of hydrogen peroxide of twelve volumes of oxygen, produces the blue spot in twenty seconds ; with six volumes, in from one to two minutes ; and with four volumes essentially no blue spot is produced, only possibly a blue rim.

Hydrogen peroxide with only four volumes is quite unreliable.

Dentists have also occasion to make other tests in their practice, which, with appropriate test-papers and clear directions accompanying them, can readily be made.

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CORRESPONDENCE.

THE DENTAL LAW OF ITALY.

TO THE EDITOR OF THE DENTAL COSMOS :

Dear Sir,—The profession in America may be interested in reading a literal translation of a law regulating the practice of dentistry in the kingdom of Italy, recently passed by the Italian government, as follows :

No. 6850, series 3, in collection of official laws and decrees of the kingdom of Italy, contains the following:

HUMBERT I,

By the grace of God and will of the nation King of Italy. Seen the laws of 13th November, 1859, No. 3725; 16th February, 1861; 8th October, 1876; 22d December, 1888; 9th October, 1889; and with the intention of establishing fixed rules and identical methods of conferring the diploma of dentistry in all the universities of the kingdom; having conferred with our Council of Superior Instruction, having heard the Council of State on the proposition of our Minister-Secretary of State for Public Instruction and Secretary of State for Internal Affairs,

We do hereby decree—

ART. 1. Whosoever shall desire to practice dentistry or phlebotomy must have the degree in medicine and surgery.

ART. 2. The teaching of dentistry shall be imparted in the surgical institutes of those faculties in our kingdom who can demonstrate having the necessary means and persons capable of such teaching according to the most recent progress of the specialty.

ART. 3. The nominations of teachers shall be made according to the existing rules for the appointment of professors extraordinary after having heard the opinion of the Superior Council.

ART. 4. Those who have undertaken courses in dentistry or phlebotomy previous to the publication of this decree can finish and obtain their degrees under the rules in operation at the time of their entry. They also, as well as dentists already in practice, can continue under the Art. 60 of the law of 9th October, 1889, No. 6442 (series 3).

We order that the present decree, furnished with the seal of state, be inscribed among the official laws and decrees of our kingdom, and be it seen that this law shall be observed.

Given in Rome, April 24, 1890. HUMBERT.

{SEAL.} BOSELLE.
CRISPI.

In order to fully understand the above important progressive step, it should be known that every matriculant in the medical department of any university in the kingdom of Italy must possess the degree of A.B. Also, that the medical course for the degree of M.D. continues through six years, after which the law will regard the graduate as prepared to enter upon the study of dental science and art. With this law in successful operation there will be no question about the oral surgeon's position as a professional man, any more than that of any other specialist. In brief, this law, with one short, sharp, and decisive blow, stops the ignorant charlatan from practicing dentistry, and should meet the approval of all who have the good of our profession at heart. The possessor of a dental degree under this law will certainly enjoy the enviable distinction of being permitted to practice in any country, while the possessor of the D.D.S. degree only may have to take a back seat.

In fact, the advantages of a degree under this law are so many and so obvious that I heartily wish my own country would pass a similar law. I am perfectly aware of the objections a large portion of the dental profession have raised to the advisability or necessity of acquiring the degree of M.D. previous to the D.D.S., but the world knows that it is not possible to take a young man with little or no education and make an educated professional gentleman of him in two years. Those who hold that deft, skillful fingers and a smattering of medicine are sufficient for a dentist must submit to being referred to by a large portion of the intelligent world as "only dentists." Look to your laurels, gentlemen of our profession in America.

JAMES G. VON MARTER, A.M., D.D.S.

ROME, ITALY.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

(Continued from page 704.)

FIRST DAY—*Evening Session* (Continued).

A VOLUNTARY paper entitled "Education and the Obligations it Involves," by Dr. Chas. B. Atkinson, New York, recommended by the Section, was read by Dr. Ottofy, in which the idea was advanced that the schools should harmonize their teaching and teach all meritorious methods, instead of each promulgating its own theories and holding out as inducement for students the idea that in this or that direction the training of the particular school in question was superior to that of the others. The purpose of the school is to teach the assembled knowledge up to date. The first step involved in the education of a professional man is the determination of the propriety of the individual undertaking the study of the professional branch under consideration. As an aid to the selection of the proper material for the colleges, applicants might be recommended, after an inquiry as to antecedents and personal character by a local association, to a preliminary examination, not only as to intellectual attainment, but to determine their manual dexterity and mental ingenuity from the mechanical aspect. After entrance to the college the students' societies help effectively to prepare the student, not only to acquire knowledge but also to effectively use it. The mere presenting of a subject before an audience gives one a wider grasp of that subject, and is a stimulus to others. Undoubtedly each individual professional man owes to the body at large a tithe of work for the benefit of the whole, but what proportion of dentists are working to that end? A few bear the brunt in literature, a few in the clinics. A professional education forces upon an individual certain duties,—to combat disease, not because he is paid for the time spent in the effort, but because he is fitted to do it. The recompense will come in time to the earnest man. With a properly arranged intellectuality, the three-course studentship of six months each should be sufficient to impart a practical knowledge of dentistry, provided the other six months in each of the three years is devoted to infirmary practice.

Dr. Peirce announced that the Section had received a voluntary paper by Dr. R. Ottolengui, of New York, entitled "How to Inaugurate a National Degree," a portion of which they recommended be read.

The portions of the paper indicated were then read by Dr. Ottofy. The writer, after recounting the objections to the present system of education, expressed the opinion that most of these would cease to exist if the schools were deprived of the right to grant diplomas. He therefore advocated making the schools merely educational bodies; the diploma to be granted by an independent body which should fix the standard to which all students must come up before the diploma could be obtained. Thus self-interest would compel the colleges to increase the facilities for acquiring knowledge. To accomplish this, a decree should be obtained from Congress, if need be, under which say twenty men representing all parts of the United States should be selected as a national board of examiners, with power to confer a degree to be known as D.O.S., Doctor of Oral Surgery. This board would meet alternately on the Atlantic coast, along the Mississippi, and on the Pacific slope, once annually, to examine candidates and confer the national degree, to which examination anyone should be eligible. An average of eighty per cent. should be required to pass. The fee for examination should be variable. Thus, when the board met on the Atlantic slope, the fee to residents of that section would be thirty dollars, to those in the Mississippi Valley twenty dollars, and to those from the Pacific section ten dollars, and the reverse when they met on the Pacific coast; when meetings were held on the Mississippi, the fees for residents of either coast would be twenty dollars, and for those of the valley thirty dollars. Candidates for the diploma desiring to be examined at some other time than the regular meetings would notify the examiner living nearest to them. This notification would be read before the next full board. Immediately after the meeting of the board convened, each examiner would present a written copy of the questions to be used by him in his examinations, which must be approved by the vote of the whole board. The questions would then be printed on slips, a set of these being intrusted to the examiner presenting the name of the candidate who wished a special examination. Upon the return of the said examiner to his home, he would summon the candidate to his office, where, under his eye, the replies to the questions on the slips should be written ; after which each slip must be mailed to the individual examiners interested, who would rate the candidate in the usual way and forward the slip with his rating to the proper officer of the board, who would figure up the percentage and announce whether the candidate had passed or not. If passed, the candidate must wait for his diploma until the next meeting of the board, but a certificate might be issued in the interim. The candidate must also submit to the regular practical examination, as much of his work as possible being sent to the proper examiners. The fee for such a special examination should be double that for the regular examination.

As tending to show that this national board special degree would have the effect intended, the writer instanced the history of the New York State Board of Censors, which grants a degree to successful applicants. When the law under which that body operates first went into effect, many prophesied that its operation would be a farce ; but it has not so transpired. Since 1870 two hundred and ten applicants have been examined, of whom one hundred and three have received the degree,—less than 50 per cent. Of the entire number presenting themselves for examination, twenty-five have been graduates of dental colleges. Of these, twenty-two were successful, showing 12 per cent. of failures. The graduates submitted to the examination voluntarily. If all graduates were compelled to go before such a board, the percentage of failures under present conditions would be nearer twenty than twelve.

The resignations of Drs. W. P. Dickinson, Minneapolis ; E. C. Wadsworth, A. H. Brockway, and T. A. Wadsworth, Brooklyn ; and S. G. Stevens, Boston, Mass., were received and accepted.

Thursday evening was set apart, on motion of Dr. M. L. Rhein, for the presentation of papers from Sections IV and VII, including the lantern exhibits with which they were to be illustrated.

On motion of Dr. Taft, a committee of three on necrology was appointed,—Drs. Taft, Eames, and Truman. The committee subsequently reported a fitting memorial of the late Dr. Homer Judd, of Upper Alton, Ill., a former president of the association. The report was adopted by rising vote.

SECOND DAY—*Morning Session.*

The association was called to order at 9.45 A.M., Vice-President Harlan in the chair.

The consideration of Section II was resumed.

Chairman Peirce read the report, which places the present number of dental colleges in operation at thirty-three. Nine hundred and sixty-three persons have been graduated since the last meeting of this association by twenty-nine colleges, an increase of one hundred and sixty-three. The total number of graduates from 1886 to 1890, inclusive, is 3605. The Section considers the rapid increase of dental colleges a menace to the future prosperity of the profession. Possibly the only remedy at present available is the amendment of State constitutions so that at least none but "reputable and capable" men can secure articles of incorporation. An effort is being made to establish a national university at Washington, D. C. Those interested in dentistry should be on the alert to see that it is represented.

Whether the profession shall reap the full benefit from the three years' graded course to be established by the dental colleges depends largely upon the State boards of dental examiners and the encouragement they receive from their national association. They can correct violations or evasions of the rules governing the advanced requirements. Since the last meeting of this association, two States, Massachusetts and New Jersey, have modified their dental laws so as to require examination of all persons purposing to practice dentistry within their borders, whether college graduates or not. Of course, the value of a State board's examination depends upon the qualifications of those who conduct it, and the qualities demanded of them are so varied that it is a pertinent question whether the graduates of five, ten, fifteen, or twenty years ago, of which examining boards are mostly composed, are qualified to judge of more than the surface or superficial qualifications of the student, and whether they may not do the applicant an injustice through their own ignorance.

The chairman of the Section presents now, with the approval of the Section, an idea which when he first promulgated it some years ago was regarded as premature or Utopian,—namely, that there is an imperative necessity for a higher standard than is now required by any of the schools ; and it is recommended that the association should appoint a committee of five to consider the advisability of establishing a national board of examiners, with power to confer a title or degree upon those who by experimental and true scientific work have shown themselves worthy of such distinction.

Following out the instruction given to it last year to formulate a plan of work for the sections, Section II finds the following state of facts : That the American Dental Association is not a truly representative body ; that its membership is too small to accomplish what it should ; that there are between ninety and one hundred dental societies in the United States, excluding alumni and other kindred organizations, with an aggregate membership of from 3000 to 3500 ; that all the States except Montana, Nevada, Oregon, and Washington have State societies, the District of Columbia two societies, while there are none in the eight Territories ; that last year this large membership was represented in this body by thirty-eight delegates sent up by twenty-two societies, located in twelve States and the District of Columbia ; that the membership of the association was composed of twenty-three dentists from the West, two from the Northwest, fourteen from the South, and one hundred and thirty-six from the Eastern States ; that three States contributed seventy-five members and the remaining twenty-three States represented contributed one hundred.

To remedy this state of affairs an invitation or appeal should be issued to every society to send delegates to the meetings of this association, even if it should be necessary for the society to pay a fair compensation to their representatives. When this can be accomplished, the Section would recommend the following method of work to the sections : Have reports prepared of all meetings of societies, important clinics, new appliances and methods, and abstracts of papers published in the journals ; each section would then be enabled to sift out the chaff in its department of labor and present to this association a summary of everything affecting dentistry in any way occurring during the year covered by the report.

The report then commends a forthcoming treatise on irregularities, by Dr. John N. Farrar, and concludes with the statement that there is nothing to report on dental nomenclature.

The resolution recommended by the Section providing for the appointment of a committee of five to report a plan for the unification of State laws regulating the practice of dentistry was adopted, and Drs. A. H. Thompson, Topeka, Kan. ; J. Y. Crawford, Nashville, Tenn. ; C. N. Peirce, Philadelphia ; H. B. Noble, Washington, D. C., and W. W. Walker, New York, were appointed as the committee.

Dr. H. B. Noble, Washington, D. C., was deeply interested in the subject of dental education, more especially in the direction of securing uniformity of State laws regulating dentistry. The dentists of the District of Columbia have been trying for years to get a law from Congress on the subject, and they were working hard for it. In looking over the laws which obtain in the various States, one is struck by the great variety of provisions presented, and how mixed compared one with the other they are. That very question had to be met before the committee of Congress when they asked what legislation had been had in the States and what was desirable for the District. There is now an act pending before one house, having passed the other, which would meet the wishes of the Washington dentists. If any of the gentlemen present have any influence with their representatives, he wished they would use it in behalf of this bill. One point made in the paper which advocated the formation of a national board to confer degrees was the need of uniformity of educational qualifications. We have got to come to uniformity, and perhaps the best thing to do would be to get the colleges to adopt a uniform curriculum. In framing the act before referred to as now before Congress, there was considerable discussion as to whether the diplomas of reputable colleges should be recognized, or whether all applicants should be compelled to stand an examination. Take the case of the lawyers. They have to stand an examination as to their qualifications wherever they go to practice, and they expect nothing less. No school's diploma lets them through. Dr. Shepard's paper published in the DENTAL COSMOS for February, 1890, met the speaker's views largely. This association should take some definite action in the premises. It is important that the laws of the various States regulating the practice of dentistry be uniform, and that as nearly as possible the degrees granted by the various dental colleges be uniform in the qualifications which they indicate.

In reply to a question, Dr. Noble stated that they had tried to make their law as simple as possible. It provides for an examining board of five members, and all persons wishing to practice dentistry in the District of Columbia, whether graduates or not, must be examined.

One other thing. He was pained to see so few delegates present from various sections of the country. He had followed the association with a good deal of faithfulness ever since the meeting at White Sulphur Springs (1871), and he was sorry to see no more interest taken in its fortunes than is evidenced by the moderate attendance at many meetings. Something is not right, or there would be a livelier interest in the welfare of the association, and more earnest men would be found taking part in its work. There are many things which might be done to help the cause. If every delegate were required to report to this association the doings of his society for the year in scientific and practical work, or if some one were delegated from various points to visit the societies in his section and report here what he found, there would be a mass of material which would be found useful. He had no definite steps to propose, but we should be able to get work done during the year in every section that would make this association what it ought to be, the recognized center of dental progress. What is wanted is to get at the scientific and practical advances of dentistry in every direction.

Dr. E. Parmly Brown, New York, considered the procuring of uniformity in the laws regulating dentistry as of the highest importance. It is so important that it would be well for the committee to make a study of the subject, even if it should take five years to accomplish it. There is now no uniformity. He had been in dentistry all his life, yet if he were to go to New Jersey to-day to practice he would have to stand an examination before a lot of boys to whom he had taught dentistry. If this association should compare the laws of the various States and recommend those features or that law which it deemed best for the interests of all concerned, that would have weight.

Dr. C. S. Stockton, Newark, N. J. For all time lawyers and fanatics have been trying to make uniform laws for marriage, and they have failed. So it will be in regard to the unification of laws upon the subject of dentistry. It would probably take more than five years to decide upon the features of a uniform law for all the States, and then it would take five times five years to get it through the legislatures of the various States. It is almost an impossible task to unify the State laws. In regard to the New Jersey law there are some peculiar things. Years ago there was no law in the State, which was overrun by incompetents from other States; then we had one enacted that compelled those intending to practice, who were not college graduates, to go before an examining board. That helped the dentists. Then we had an attempt to pass a law to confer a State degree, but fortunately that was defeated. Then we went on, and to-day we have a law under which no one can begin the practice of dentistry in New Jersey unless he goes before the board of examiners. Some may think, from what Dr. Brown has said, that Father Atkinson, for instance, cannot come to New Jersey to practice without being examined. That is not so, and it was not so intended, but the object was to prevent those just from college from practicing unless they were properly qualified. The speaker had in mind the case of one of these who didn't know so simple a thing as the proper way to repair a rubber plate which had been broken. As to the working of the law, he had no doubt it would work well for New Jersey. In his opinion, the high standing of the dental profession of the State was due to the State society and the laws.

One word with regard to the workings of the Sections. He does not know how to make the results worthy of the dentists of America. In the New Jersey State Society they have a plan by which papers to be read are placed in the possession of a committee at least three months, if possible, before the meeting, and the committee has them reviewed by other members, sometimes other papers being written upon them. Some such idea might be adopted here with advantage.

Dr. A. Wilkes Smith, Richmond, Ky., discussing the idea of uniformity of legislation, did not think laws would make dentists more proficient in their work. He did not believe in too much law,—just enough to draw the line of demarkation. In reference to the attendance at the meetings, it might be well to recommend societies sending delegates to pay the expenses of their representatives. Many who come to these meetings do so at a great sacrifice of time and money.

They have to close up their offices while they are away, and it has happened that those who never come gradually take away the practice of those who do.

Dr. J. Y. Crawford, Nashville, Tenn., thought Dr. Smith was largely right. It was questionable whether the vast amount of discussion which has been given to the subject of legislation of late years has been conducive to good or not. If we go on in the same line for another term of years, it may be that a reverse action will set in. Has the aggregate result to the whole people—not merely to the dentists—been beneficent? Has all this agitation resulted in a real advance? There was scarcely a perceptible difference in the average dentistry between the States which have laws and those which have not. The principal good to the people, in the speaker's opinion, is the moral force of a statute, and therefore the simpler the law the better. Such a law is more likely to meet the approval of those who have the power to pass them. He was, with others in his State, for eight years consecutively at the doors of their legislature, asking the passage of the simplest kind of a law, without success, and he was satisfied from that experience that for some years to come there would be no dental legislation in Tennessee. Every law, every institution that stands, must be built upon the principle of right. If laws are to stand in the various States, they must be in conformity to right and justice, and they must be courteous in their application. A good example is found in the legal profession. A qualified lawyer is recognized and fellowshipped in every place. He goes into a strange court, presents his credentials, and the judge on the bench at once says, "Mr. Sheriff, give the gentleman a seat."

How many are there here to-day who could pass a seventy-five per cent. examination? In his opinion, it should be the case that when an examining board in one State grants a license to practice dentistry it should stand forever and everywhere as evidence of its holder's fitness, unless he does something to degrade his profession and thus earns dismissal from its ranks. There are not enough dentists to-day, and there is no fear of good men being crowded out. There are not enough dentists to merely scrape off the calculus that accumulates on the teeth of Americans, saying nothing of the other operations needed. Let us so prepare our students that when they go to the college they will be fitted to intelligently grasp the subjects placed before them. He was one of those who believed that better dentists could be made in the schools of to-day in two years than in the old way in ten years.

Dr. John C. Storey, Dallas, Tex., was glad to see the American Dental Association taking high ground on this subject. It is on the right track. The law in force in Texas makes the judges of the district courts the judges as to what constitutes a reputable dentist. We have an examining board in each judicial district, of which there are forty-seven in the State. It thus requires one hundred and forty-one reputable dentists to complete the examining boards. There are not half that many reputable dentists in the State of Texas. If there could be a uniform law in all the States as the result of the work of this association, that would be the grandest achievement ever set on foot by the American Dental Association. What a commentary on our American dental colleges is presented in the spectacle of their graduates going before an examining board to be examined as to their fitness to practice dentistry. For himself he would not give two bits for a diploma which only permitted him to go before a board, many of the members of which were utterly ignorant of the fundamental principles of dentistry. He was not guessing about this; it was a fact. But progress has been made, and if we can get a national law it will be a grand advance. He thinks dental laws which do not recognize the diplomas of reputable colleges are a mistake. If such a diploma means anything, it means that its holder is competent to practice dentistry, and it should be a passport to the right to practice anywhere. In preparing a student for practice, time should not be a requisite: but knowledge is requisite. When the student has acquired the necessary knowledge, whether it be in one year or ten, give him a diploma, and not till then. With the possession of the diploma based on that requirement there will be no use for State laws or for examining boards, and no use for all this talk.

Dr. W. W. Allport, Chicago, thought Dr. Storey told a great truth when he said a diploma should be a passport to the right to practice. So it should, and if our dental colleges were what they should be, it would be. But the colleges are not what they should be, and a great majority of the diplomas granted are no indication that their holders are competent to practice. That is why we have to have State laws to prevent the States from being overrun with unqualified men. We have many dental colleges in Chicago. The State law makes it easy to incorporate a college in Illinois. It is only necessary for three men to send three dollars to the State treasurer, and they can found a college having all the rights possessed by the Chicago College of Dental Surgery or any other college. Dishonest men will take advantage of such a law, and start institutions the first purpose of which is not to turn out qualified dentists. So long as such things are possible, there must be State laws as a check or safeguard. If the colleges were only sure to teach their students what it is in their power to teach, much would be gained. But some of their students are incapable of being taught, because of their lack of intelligence. The schools say they will not take such persons as students, but many of them do take practically anyone who can pay the fees.

If there were a national law that no colleges should be incorporated unless they could show proper qualifications for teaching, that would be an advance. As matters now are, the State examining boards are the only safeguard. No sensible board would think of examining Dr. Atkinson or Dr. Storey as to his fitness to practice. It is the spirit of the law, not its letter, that is to govern in such cases. If the State boards were to agree that certain qualifications must be possessed by applicants, that would be better than the adoption of a uniform law. It would be, in fact, a uniform law.

As to what Dr. Noble said about the District of Columbia law, he would be willing to assist those interested directly in any useful way in getting it passed. If a resolution were adopted here and sent to the members of the House of Representatives asking them to pass the law already passed by the Senate, it would have its effect.

Dr. C. L. Goddard, San Francisco, referring to the attempt to secure uniform laws, said that several years since the National Association of Dental Examiners framed a law and asked to have it passed by the various States seeking legislation. The law in California is almost exactly the same as that recommended by the national board. At the time it seemed the best possible ; but there can be no unification of laws, because our ideas grow. Since the time that law was passed other States have enacted legislation which is in advance of California's. He saw no way of securing uniformity but through Congress. Much depends upon the interpretation of the laws by the State boards of examiners. In California the board passes the diplomas of reputable colleges, but in any State the severity of the examination depends on the board.

Dr. P. T. Smith, Denver, Col., was interested in the securing of uniform dental laws, but that was a physical method of advancing dental education. If we were to take into the consideration of the subject the range of some of the papers read, we might get a better idea of the true method of advancing, which depends on moral character. He had been among the earlier advocates of dental laws, but that was not the true way to lift dentistry up. It is a work we have to do, not a pleasure to indulge, and we must be aggressive and adduce our ideas in advance. Dr. Atkinson's paper, which goes down deep, —too deep, perhaps,—aims to establish something in the way of principles at the foundation of education. Unless we have these basal principles, how can we build safely? What causes decay? What causes the suffering so familiar to the dentist? These and a thousand other questions cannot be intelligently answered, because we have not gone deep enough. By applying ourselves to these questions we educate the people. Thus if we go into neighborhoods where men of note have labored, we see at once the difference between the education of the people there and in localities which have not been so blessed. We must bring up our knowledge of the basal principles as far as we can so as to familiarize ourselves with the causes of disease, and thus be enabled to combat it. Disease is simply inharmony, and harmony is the objective point to reach out for. In the formation of an organic body, there is a duality of forces at work, and none grow unless the positive and negative work together. [The speaker here illustrated his idea of duality by blackboard diagrams.] The composition of organic bodies is arbitrary, and if the arrangement of the molecules were always the same, every individual would be exactly like every other. The point of Dr. Atkinson's paper to which he wished to direct special attention was the statement that the mental forces received their bent long before the time for professional education commenced. There cannot be proper physical harmony without mental harmony.

Dr. James Truman, Philadelphia, Pa., thought the subject one of the greatest importance at the present time. Dentistry is in a transitional stage, passing from that state in which it was without law to that where it was likely to be governed and in a measure possibly injured by law. There is danger in tampering too much with law. Those of us who have known what it was to feel the iron in our souls under the old effete governments of Europe, know what it is to be ground down by law. He was not opposed to dental laws, but when the laws of the various States present a mass of contradictions, as at present, there is a demand for unification. When a law says that a man who has been in practice for twenty-five years must go before a board, pay a fee, and be examined, it becomes unbearable. He had been engaged actively in dental education for twenty-five years, and had necessarily been brought into close contact with the students. He did not believe in making the teaching so difficult as to make it an injury. In the old way of teaching there was a great deal of the didactic, and it was not unusual for some of the professors to go on, year after year, imparting the same instruction from written lectures. That is largely changed, and the lectures are vastly improved, the common practice being to deliver them off-hand. Every man who teaches should be able to stand before the class of students and give out to them the facts he wishes to inculcate, or he is not qualified as an instructor. Every year makes changes in the method of teaching, and the changes are all in the direction of increased efficiency. He believed that they would yet come to the practical demonstration of scientific results.

With regard to technicalities, some teachers overload their lectures with technical terms which cannot, in the nature of things, be clearly understood by those to whom they are addressed. The best teacher is the one who brings his language down to the simplest possible terms that will express his meaning, with as little as possible of technicalities. Of course, technical terms cannot be wholly avoided, but the lecture should be in the simplest possible English. [Dr. Truman here referred to Dr. Farrar's work on irregularities as a model of expression for the comprehension of the student.] But what is wanted in dental education is not only men to teach and men to write, but men to come to the meetings of this association. This is the great educator, after all. And those who come ought to be liberal. They should not attempt to crush anybody. It is not the best way to get the best work and the best results out of the colleges to be constantly saying that they are turning out bad men or incompetent men. Give them encouragement, not querulous fault-finding, and in ten years' time there will be no need of complaint.

Dr. J. N. Crouse, Chicago, president of the Dental Protective Association, asked for a suspension of the rules in order to present some matters in connection with that association which were important to the dental profession, and, on his request being granted, said that he was there first to endeavor to get every man attending the meeting, who had not yet joined the Protective Association, to become a member. When he claimed that the Protective Association saved the dental profession of America a half-million dollars a year, he did not overstretch it. Three out of four dentists would be paying a license to the International Tooth Crown Company, if it were not for that association. He wished to call a meeting of the members, and would show what was being done, and would ask to have his accounts examined, so that the manner in which the association did business might be known. He considered the matter of the Protective Association the most important before the profession. They have never before had such an organization, and they should support it in the work it is doing. He asked that a committee be appointed to examine the accounts of the association, and make report as to whether it was doing faithful work or not.

Dr. Crawford moved that a committee of four, representing the different sections of the country, be appointed for the purpose. So ordered, and Drs. C. L. Goddard, San Francisco; J. Y. Crawford, Nashville, Tenn.; W. W. Walker, New York, and F. H. Gardiner, Chicago, were appointed.

The consideration of Section II was resumed.

Dr. W. H. Atkinson, New York. Success in all joint investigations grows out of the respect for each other of those making the investigation, and the ignoring of the littlenesses so often found in human affairs. What is needed first is points of agreement as the basis for any investigation. If the foundations are so fixed in our minds, we may go forward. Among real naturalists one is not bound to point to his authority, for they take it for granted that what has been published is known to all. In considering the question of education, let us be fully clear in our own minds that we have grasped the truth, and there will be but little difficulty in finding the means to make education what it should be, the leading forth of that which is within.

Adjourned to 7.30 P.M.

Evening Session.

The association met at 8.15 P.M. President Foster in the chair.

The secretary read a communication from the National Association of Dental Examiners, calling attention to the case carried up from the courts of New Hampshire to the Supreme Court of the United States, involving the constitutionality of the New Hampshire law regulating the practice of dentistry, and asking that such action be taken that the case shall not go by default.

Drs. Patterson, Atkinson, and Goddard were appointed a committee to consider the matter and report what action, if any, should be taken by the association.

Dr. Truman moved that the lantern exhibits appointed for Thursday evening be limited to one hour. So ordered.

Section II was again taken up. Dr. Peirce, referring to the report, called attention to the paragraph alluding to the desirability of a degree or other honorarium higher than the D.D.S., as a stimulus to scientific work. The profession would be the gainers by having formulated by this body some plan for the organization of a fellowship, in which membership could be gained only by additional scientific labor after the D.D.S. was obtained.

Dr. H. A. Smith, Cincinnati, was interested in the suggestion, and he would have been glad if the Section had presented some expression on the subject. It might be well to have an academy of dental science, entrance to which could only be earned by scientific research.

Section II was passed.

Section III, Operative Dentistry, was called, and Dr. Crouse stated that owing to the continued indisposition of Dr. Darby he had been made chairman *pro tem.* Two voluntary papers had been referred to the Section, which had been confided to Dr. Baldwin for the purpose of presenting a condensed resumé of their contents.

Dr. A. E. Baldwin, Chicago, read the condensation of the two papers referred to. The first was by Dr. Charles B. Atkinson, New York, on the subject of "Medicated Oxyphosphate Fillings," in which he advises, after an experience of two years in capping exposed pulps after the method described below, the admixture of various medicaments with the filling-material. He claims that upon the crystallization of the oxyphosphate no further change takes place, and the remedy may constantly exert its influence on the walls of the cavity, resisting germ action, and that thus are brought about increased hardness and increased resistance to thermal changes. The medicaments so used are : 1, creasote and oil of cloves, equal parts ; 2, eugenol ; 3, deliquesced carbolic acid ; 4, oil of cinnamon ; 5, oil of cloves ; 6, creasote, pure ; 7, creasote, oil of cloves, and iodoform ; 8, creolin ; 9, campho-phenique ; 10, potassium chlorate (powdered) ; 11, salicylic acid ; 12, camphor (pulverized) ; 13, stick sulphur (pulverized) ; 14, iodoform ; 15, oil of wintergreen. The first seven have been fairly tested, and are about equal in durability, manipulative qualities, and time of setting. He employs them also in retaining inlays, in setting retaining-fixtures in pyorrhea cases, in setting crowns, etc. In capping pulps he always covers the exposure first with a mixture of oxide of zinc, creasote, and oil of cloves, and adds a remedial agent to the oxyphosphate filling. He employs mostly the first-named in the list. If the medicament is a liquid, he adds about an equal quantity of the medicament and phosphoric acid ; if a powder, about equal parts of the medicament and oxide. The proportions may be varied as required. The average time of setting is about ten minutes.

The second paper was entitled "A Few Words on Corrective, Preservative, and Obtundent Treatment of the Teeth," by Dr. J. L. Williams, Boston. In 1856 the writer published his idea of the treatment of endangered but not exposed pulps, by the saturation of the cavity with non-irritant corrective and antiseptic applications, which were to be sealed in, the applications to be repeated when necessary. Mild applications he considered better than strong ones. Antiseptics at that time were few in number, and it was his practice to use oxide of zinc to stiffen gutta-percha. In obtunding, the treatment should be gradual and preparative. The great object is not to see how much nature will bear, but to assist her in the reparative process. He uses solution of calcium chloride in checking fermentation in deep-seated caries. He claims, first, a systematized plan favoring the deposit of secondary dentine and of obtunding sensitiveness ; second, the first use of oxide of zinc in connection with gutta-percha as a plastic stopping.

Dr. N. S. Hoff, Ann Arbor, Mich., secretary of the Section, read the report, of which an abstract follows :

Owing to the continued illness of its chairman, Dr. E. T. Darby, the Section was unable to present as full a report as the importance of the work deserved. An examination of the journalistic and society literature shows that a larger number of original papers have been prepared on operative dentistry than on any other subject, and more time has been spent in discussing questions involving methods of practice or manipulation than any other. The Section has in course of preparation a subject index of all the matter bearing upon this department which has appeared in the journals, domestic and foreign, during the past twelve months, and they ask the privilege of incorporating it in the report in the annual Transactions.

Root-filling has received unusual attention during the year, the profession almost universally indorsing the conclusions reached in the discussion at the last meeting of this association. After specially commending two papers,* the report mentions two additional materials for filling roots,—namely, red cedar plugs saturated with paraffine, suggested by Dr. James H. Beebee,† Rochester, N. Y.; and beeswax, offered by Dr. B. F. Arrington,‡ Asheville, N. C. Dr. L. C. Taylor, Hartford, Conn., advises the dropping of chloroform into inferior root-canals sufficient to dissolve a piece of gutta-percha by agitating with an instrument; the idea being that when the hard cone is forced down, the entire cavity will be better filled than by the usual method. Dr. W. Storer How has devised a set of probes and pluggers for applying dressings in and filling small and tortuous canals. They are held adjustably so as to prevent forcing the material beyond the foramen.

The report called attention to Dr. W. D. Miller's paper § on the comparative value of various antiseptics in the treatment of diseased teeth, and stated that Dr. C. N. Peirce would present some experiments with H_2O_2. The Section had nothing new to offer in regard to the operative treatment of pyorrhea alveolaris, alveolar abscess, or exposed pulps.

Passing to the treatment of sensitive dentine, the report referred to the suggestions of Dr. J. W. Holt, of North Carolina, direct application of heated instruments; || Dr. W. H. Dwinelle, New York, chloride of zinc in addition to the heated instruments;¶ and Dr. Rhein's continued use of chloride of methyl.** While the numerous efforts in this direction have given methods and remedies which

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* "Treatment of Teeth having Foul Pulps," by A. Retter, Utica, N. Y., DENTAL COSMOS, December, 1889, page 933. "Action of the Peroxide of Hydrogen upon the Teeth," by W. D. Miller, *Ibid.*, April, 1890, page 253.

† *Ibid.*, December, 1889, page 993.

‡ *Ibid.*, March, 1890, page 248.

§ "Experiments on the Comparative Value of Various Antiseptics in the Treatment of Diseased Teeth," by W. D. Miller, *Ibid.*, August, 1890, page 589.

|| *Ibid.*, September, 1889, page 694.

¶ *Ibid.*, page 697.

** *Ibid.*, June, 1890, page 465.

render many operations tolerable that would otherwise be unbearable, no reliable remedy has yet been found.

While there was nothing new in methods of filling teeth, the Section looked forward to the time when the cause of caries and of the dissolution of filling-materials should be definitely known, as would also be the way to combat the influence of deleterious agents by prophylactic measures, and when dentists would be able to supply a filling-material which would resist all dissolving action and the methods of manipulation would be simplified and more definite. Amalgam alloy (unincorporated with mercury) mixed with oxychloride of zinc[*] has been suggested by Dr. C. B. Parker, of Brooklyn, N. Y., and a combination of gold and amalgam[†] by Dr. Dwight M. Clapp, of Boston. In the use of copper amalgam, Dr. W. B. Ames, of Chicago, advises that the amalgam, after being heated and mashed in the mortar to a fine powder, be triturated with nitrate of mercury until the powder has taken up sufficient of the mercury to form a paste of proper consistence.

In the matter of inlays, the report refers to the diamond trephines[‡] devised by Dr. George H. Weagant, of Cornwall, Ontario, Canada, for cutting out sections of porcelain teeeth, and Dr. S. D. Rambo's method of restoring corners and sections of decayed and broken teeth.[§] White vulcanized rubber, which has several advantages, is also recommended as an inlay.

The report closed with a list of the new materials and appliances brought out by the dental manufacturers during the year.

Dr. Peirce. The use of peroxide of hydrogen in cleansing cavities of the products of decomposition and in freeing the teeth from stains is familiar to all dentists. It had occurred to him that the profession were in the dark as to all its effects, and among other things were quite undecided as to its action, if any, on the tooth itself. He had heard it stated that the tooth would be decalcified from the use of the drug, and he determined to test the matter somewhat. On the 7th of July he placed a bicuspid which was largely exostosed in a dram and a half of the peroxide. In twenty-four hours the liquid had ceased to act, and in the bottom of the vial there was a flocculent precipitate, showing that the organic parts of a portion of the exostosis had been dissolved out and the lime-salts thrown down. He again placed the tooth in fresh peroxide, with the same results, and this was repeated again and again until the exostosed portion was removed and the dentine proper was exposed. Here the action was much slower, requiring forty-eight hours to render the solution inert. The experiments were kept up until the 27th July, at which time the root of the tooth had been reduced fully two-thirds of its bulk, and was quite translucent. There was no softening of the tooth, which showed that the organic material was taken out first. The precipitate was not analyzed. He had recounted this experiment because from his observation during its progress the action of the peroxide on the tooth-substance seemed to be like that of an acid.

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[*] "Zinc-Phosphate and Alloy Filings Mixed, as a Filling-Material," by C. B. Parker, Brooklyn, N. Y., DENTAL COSMOS, January, 1890, page 30.

[†] *Ibid.*, page 36.

[‡] *Ibid.*, February, 1890, page 159.

[§] *Ibid.*, page 157.

Dr. Truman W. Brophy, Chicago. These experiments should have been performed with a preparation which was known to be neutralized. It is well known that sulphuric acid is frequently added to the peroxide to preserve it, as it is apt to become disorganized under the action of light. If neutralized, it would not destroy the tooth.

Dr. M. L. Rhein, New York, had tried an experiment to determine the action of peroxide of hydrogen on calcareous deposits. He used Marchand's preparation, which is supposed to be free from acids. He found a large amount of deposit going on in the same manner Dr. Peirce speaks of in his experiment. He did not complete all the tests he intended to. There was quite a quantity of the calculus left, but that the peroxide had a dissolving effect there could be no question. The point which his experiment seemed to establish was that the drug in question could be used in softening tenacious deposits of calculus around the teeth, and he would like to see its action in that direction investigated by others.

Dr. Peirce. If there had been an acid present, the lime-salts would not have been precipitated, but would have been held in solution.

Dr. Harlan. The question of the action of peroxide of hydrogen on the teeth has received but little attention. Peroxide as prepared in this country generally affords a decided acid reaction, but a solution of twelve or fourteen volumes strength should be absolutely neutral. He uses the preparations from Trommsdorf's and Scheuchardt's laboratories, which are neutral. Those who wish to use the peroxide safely and with assurance of the best results possible should see to it that they get a neutral preparation.

There was one point spoken of in the report of Section III which he wished to emphasize, the use of vulcanized white rubber for inlays in bicuspids and molars. Last year, while in Europe, he was shown a number of these inlays prepared by a gentleman from Naples, Italy. This gentleman used the English white rubber, which was vulcanized hard, and the surface so finished that the inlay could scarcely be detected from the tooth at a short distance. This substance was not only cheap, but it was also a non-conductor, a double advantage which should command attention.

Dr. W. B. Ames, Chicago. If the acid which is added to peroxide of hydrogen is sulphuric, its action would form sulphate of lime, which is slightly soluble, and hence would account for the deposit.

Dr. D. R. Stubblefield, Nashville, Tenn. Unless Dr. Brophy is absolutely certain that the impurity was sulphuric acid, there is another factor which may be worthy of consideration. The peroxide of hydrogen is derived from the action of hydrochloric acid on barium dioxide, and it may well be possible that there is some of the acid left. It can easily be tested. He had never heard of the use of sulphuric acid in the direction which had been stated. With reference to Dr. Peirce's experiment, the precipitate spoken of would have been found if hydrochloric acid were present in the solution. But it is to be said that in the local application of peroxide of hydrogen, as used in cleansing cavities, the action could amount to little, because the drug was so rapidly eliminated, and only water was left. Hydrochloric acid would dissolve the lime-salts, though it would be done slowly, comparatively speaking, and there might readily, in the experiment described by Dr. Peirce, be a flocculent precipitate from this action.

Dr. Peirce. If the tooth were placed in hydrochloric acid, would there not be some of it remaining?

Dr. Stubblefield. Oh, yes; the earthy framework.

Dr. Peirce. At no stage of the experiment was this perceptible.

Dr. Brophy, replying to the criticism of Dr. Stubblefield, said that in making the remark about sulphuric acid being used to preserve peroxide of hydrogen he had simply accepted the statement of a chemist whose knowledge of the subject was such that he saw no reason to doubt its accuracy.

Dr. William Conrad, St. Louis. At a meeting of the Missouri State Dental Society a paper was read by Dr. Henry Fisher, in which he gave Mallinckrodt as authority for the statement that sulphuric acid was placed in hydrogen peroxide to preserve it, and from this circumstance some had been inclined to ascribe the well-known effects of the drug to the presence of the sulphuric acid.

Dr. Harlan. In some of the chemistries it is stated that a small quantity of sulphuric acid is placed in hydrogen peroxide to prevent its decomposition, but he believed it to be true that if the peroxide were prepared as stated by Dr. Stubblefield the impurity might be hydrochloric acid. Besides the two manufacturers previously mentioned by the speaker as producing a neutral solution, E. Merck also has been able to entirely neutralize it.

Dr. W. H. Atkinson thought when he first began using hydrogen peroxide that he had found a bonanza, but in the course of his investigations he found that the characteristic bubbling was not confined to pus, but that mucus and blood would foam in the same way under its action. In conversation with a manufacturer of the article the easy disruption of the molecule was referred to, by which disruption there was only left H_2O (water), not a very energetic agent for cleansing pus-pockets. He felt somewhat embarrassed in speaking, because of a mishap. Somewhere on the way he had a package containing samples of glycozone and peroxide, with pamphlets describing them. If it arrived in time he would distribute its contents, and then we would see whether there would be any further need for peroxide. He had had an experience of several years in the use of glycozone. The difference between peroxide and glycozone, which is a fifteen-volume condensation of oxygen in glycerine, is that the bond of affinity in the latter is much stronger than in the peroxide, making it therefore a more potent agent. When we get a new thing we are apt to think we have settled the matter and got down to bed-rock. While he was on his feet, he desired to enter his caveat against crude experimenting and calling it scientific work.

Dr. Ottofy wished to say a few words with reference to the subject presented by Dr. C. B. Atkinson's paper. Dr. Atkinson had sent with the paper a series of samples illustrating his ideas. The speaker had himself been using iodoform and eucalyptol in connection with oxyphosphate, and he found better effects than when the oxyphosphate was used alone. Iodoform especially was preservative and to some extent a germicide.

Dr. Storey said that at the meeting in Louisville two years ago, when the subject of root-filling was up, he had made the statement that he had one prop left on which to put his faith in pulp-capping; that he did hope to save one pulp which he had capped. But that hope was gone. The patient came into his office about two weeks after he had spoken thus hopefully about the case, and said the tooth seemed to be a foot long, and he could get no sleep for the pain in it. A year or two ago he filled a cavity, at the bottom with amalgam with gold over it. There was no approach to the pulp-chamber on excavating, yet three months ago the patient came to him suffering severe pain in that tooth. He took out the filling, finding no discoloration around it, but the pulp-chamber was open and within was a decomposing pulp. Such experiences have made him very doubtful about trying to save pulps when once exposed,—that is, in his part of the world. He had practiced medicine before he began the practice of dentistry, and his experience then had led him to use as few medicines as possible, a course to which he had adhered in practicing dentistry. Oxychloride had nearly all the properties he wanted as a root-filling. It bleaches the tooth and fills the root, and it had never gone back on him. He did not know of a single failure. Why should he, in view of this record, take anything else as a substitute for it? He had found nothing else so effectual as a filler in using oxychloride in root-canals as a piece of whalebone. If this is cut very small, there will be little trouble in getting the filling where it is wanted. The oxychloride, being antiseptic, will overcome any slight remains of decomposition. He has had no satisfaction in the use of the peroxide of hydrogen.

[Dr. Peirce presented the tooth referred to in his experiment. The enamel, which, as he remarked, would have been pitted if the reagent had been acid, was not disturbed, while the exostosis and all the cementum of the root had been removed. The tooth was passed to Dr. Harlan to test the solution of peroxide in which it was kept.]

Dr. Ames. Did Dr. Peirce test the peroxide when he found it inert after the tooth had been exposed to it?

Dr. Peirce. No.

Dr. E. Parmly Brown referred to some experiments he had been making in incorporating asbestos in oxyphosphate fillings, which had been partly reported to the First District Dental Society of the State of New York. He thought the loss of two pulps ought not to scare any man from the possibilities of saving two hundred. The best filling in such cases is oxyphosphate with the asbestos, which is non-conducting. Medicaments can be incorporated with the asbestos. He had made many experimental fillings in the mouths of children, but they had not not yet been examined for results. The filling-material mentioned he had found to give excellent results under gold.

[Dr. Harlan presented a series of tests of the solution of peroxide of hydrogen in which the tooth experimented on by Dr. Peirce was kept. The tests were made with Prof. Chas. Mayr's test-papers, and showed the presence of a dilute strong acid, probably sulphuric.]

Dr. Peirce. Would Dr. Harlan consider that tests of the solution in its present condition would show the same results as before it had acted on the dentine?

Dr. Harlan. The animal matter would not decompose the acid.

(To be continued.)

SOUTHERN DENTAL ASSOCIATION.

(Concluded from page 726.)

SECOND DAY—*Evening Session.*

PRESIDENT STOREY in the chair.

After the transaction of routine business, Dr. J. H. Coyle read a paper descriptive of a case of pyorrhea alveolaris and necrosis.

W. M., a negro, aged twenty-six years, presented himself the latter part of February, 1889, with a typical case of pyorrhea in the right inferior lateral incisor. This condition was confined entirely to this one tooth, with no deposits of any character on or around any of the other teeth, and the gums in a perfectly normal condition. It was seen at a glance that the extraction of the affected tooth was a necessity, the destruction of its alveolus being so complete and the remaining attachments so slight that its removal was easily effected with the fingers alone. About the middle of March the patient returned with a very free discharge of pus, peculiar to necrosed bone, from the seat of the removed tooth. Passing a silver probe down into the bone through this opening indicated that a destructive process was going on in the cancellated portion of the bone, extending to and embracing the cuspid on the left and the sixth-year molar on the right. All the teeth embraced in this area were so loose that it seemed impossible to retain them longer, but the doctor ligated them all securely together with silk, thinking they might be saved for future usefulness, and adopted the following treatment: The cavity was syringed out with a solution of acetate of zinc, one drachm to the ounce, with a few drops of carbolic acid added. In addition to this, the following alterative and tonic was prescribed:

℞—Potass. iodidi, ℥i;
Tr. gentian. comp., f℥iv;
Spts. frumenti, f℥xii. M.
Sig.—Tablespoonful three times daily.

By the following October a complete cure had been effected, the loosened teeth having become perfectly firm and in normal position, except the right cuspid, which had assumed a horizontal position in the space formerly occupied by the extracted lateral.

The chief point of interest in this case was that the necrosis was confined entirely to the cancellated portion of the bone.

Discussion.

Dr. J. B. Patrick said his treatment would have been to take a heavy excavator and remove all soft bone, then treat with pure commercial sulphuric acid.

Dr. W. H. Atkinson indorsed this treatment, and said it was only necessary to use the remedy once; the dead bone would be removed and the live bone proliferate.

Dr. J. C. Storey showed a tooth which he had extracted. There had been no trouble with any other teeth in the mouth. This one was sore, and so loose as to be of very little use. When extracted, the roots were found to have been almost entirely absorbed.

Dr. R. Ottolengui said that many of the gentlemen present had seen teeth which had been implanted the roots of which had been absorbed.

It had been thought that it was only in the case of implanted teeth that such absorption occurs, but here is an instance where a natural tooth had lost its roots through absorption. He had seen several similar instances.

Dr. J. J. R. Patrick had seen teeth which had passed through all the phenomena of exuviated temporary teeth without any apparent cause for the peculiar condition.

Dr. S. G. Holland spoke of the wooden toothpick as a factor in the causation of pyorrhea and necrosis, and advised against its use.

Dr. W. T. Poole related a case of a patient who had one single tooth attacked with pyorrhea, without any cause which could be discovered.

Dr. E. S. Chisholm thinks pyorrhea alveolaris is a local expression of a constitutional disease, and the treatment should first be addressed to the local affection and then to the systemic cause. Otherwise the disease will be sure to return in the course of a few years.

Dr. W. J. Barton said that while the disease is sometimes caused by local irritation, the systemic condition is more frequently responsible for it, and he thought it was often hereditary. He believed the first manifestation of the disease was often the ossification of the peridental membrane, destroying its function. It is then thrown off and the tooth exfoliated.

Dr. J. Taft said he did not believe much in the constitutional cause of this disease. Those who talk of the systemic condition should tell us what they mean. Dr. Riggs did not resort to systemic medication, but relied on local treatment, with satisfactory results. It depends in the main on local trouble, and local treatment must be chiefly relied on. The paper described a case of pyorrhea in connection with necrosis. This is not a usual complication, though it occurs sometimes ; a removal of the process by solution does take place in many cases. It may be dissolved away by some solvent elaborated in the course of the disease. The treatment to secure a reparation of the parts is to remove all deposits from the teeth and their roots. If the alveolar wall remains, the removal of irritants will bring about a condition favorable to reparation. The employment of sulphuric acid will usually be very effective after the mechanical removal of débris. Two or three or more sittings should be devoted to this mechanical work, and it should be thoroughly done. In benign forms of the disease, instead of sulphuric acid he had used peroxide of hydrogen. This destroys the germs and removes from the parts all that would be in any way injurious, and the cases treated thus have done as well as any others.

Dr. Chisholm believed in the influence of heredity in this disease. He instanced his own case, saying that it had run through at least three generations of his family.

Dr. W. H. Richards mentioned two cases of men, one forty-five, the other sixty-five years of age, who had been suffering with pyorrhea alveolaris, both of whom suddenly lost their hair. He queried whether there was any connection between the disease and the sudden and complete loss of hair.

Dr. D. R. Stubblefield did not think pyorrhea alveolaris was inherited, though a tendency to the disease may be inherited. The fact that the disease may be cured by local treatment seems to prove that it is local in its origin.

Dr. J. Y. Crawford said there was so much vagueness about this disease, it seemed impossible to determine in certain cases whether the cause was systemic or purely local, though in other cases there could be no doubt. When it did not yield readily to local remedies he thought the cause was constitutional, and the system must be got in good order before the disease can be cured. A frequent exciting cause is malocclusion of the teeth. In such cases, if the teeth are brought into their proper places and all accretions removed a cure will follow.

Dr. C. E. Kells related a case that came to him for treatment. The patient had been treated for pyorrhea alveolaris and dismissed as cured. Upon examination, four teeth were found loose in their sockets and only kept in place by a ligature of gold wire. He found the only thing to be done was to extract, and then substitute artificial teeth.

Dr. H. E. Beach did not believe a genuine case of pyorrhea alveolaris had ever been cured so that it would not recur in two years.

THIRD DAY—*Afternoon Session.*

President Storey in the chair.

The Committee on Resolutions presented a resolution of respect and sorrow for the death of Dr. Homer Judd. Upon motion, a page in the record-book was directed to be devoted to this minute.

Dr. B. F. Arrington contributed a paper (read by Dr. Stubblefield) on "Amalgams."

Dr. Arrington claimed to have made a special study of amalgam and of instruments suitable for its manipulation for thirty-five years. Formerly such instruments were too large and ill adapted to the uses designed. The first set placed upon the market especially for the manipulation of amalgam were known as Arrington's amalgam pluggers. This set he now considers as incomplete and unsatisfactory; then only large cavities were filled with amalgam, whereas at present cavities of all sizes, regardless of location, are filled by some operators with this material. The set he now suggests (some designed, others selected) embraces a dozen or more, none very large, some quite small, and all practical. He held that amalgam could not be successfully manipulated with large instruments ; uses serrated instruments to convey the material, but works it with smooth-surface pluggers exclusively.

These instruments are so shaped that approximal cavities are filled as readily as surface or buccal cavities. He thought that amalgam was frequently regarded with disfavor because operations with it were not properly charged for. Under many circumstances amalgam served even a better purpose than gold in the preservation of tooth-structure, and that being the result aimed at, the preservation of the tooth should be charged for without reference to the material used. He considered that a tooth preserved by amalgam reflected as much credit upon the operator as though it had been saved by any other material, and patients should be instructed to appreciate that in the result lies the merit.

He uses serrated instruments to carry and force into position the blocks or squares of amalgam, and they also serve a useful purpose in carrying into position lead caps filled with beeswax, or lead bases, of which he makes frequent use in cavities where there is close approach to the pulp.

The same instruments are also useful for pressing pellets of tin on fillings for the removal of excess of mercury. One of the set of instruments which he uses is a double-end trimmer for removal of material when impacted between the teeth. It has a straight and a right-angled blade, very thin, file-cut on edge, with watch-spring temper.

His method of using amalgam is to incorporate the filings with mercury in the palm of the hand, and then reduce it by grinding in a Wedgwood mortar to a velvety fineness. Before commencing to rub it in the hand, he covers the filings and the mercury with water, adding a few drops of sulphuric acid, as recommended by Dr. J. H. Harris ; washes thoroughly and rewashes with water and then alcohol; he then places the mass in a piece of chamois skin and twists until there are no signs of mercury passing through the skin, flattens the mass by pressure to a thickness from one-twelfth to one-sixteenth or one-twentieth of an inch, according to the character of the cavity to be filled ; then cuts into squares or blocks proportioned to the cavity, and condenses each piece thoroughly before adding another. Every fissure and portion of the cavity-surface should be perfectly packed with steady, forcible hand-pressure, and varied movement of the instrument from right to left and left to right and round and round. If during the filling there should appear an excess of mercury, apply pellets of tin foil successively under heavy pressure. When the cavity is filled to completion, after a thorough condensation, again apply the pellets of tin to every portion of the surface, especially to the edges and fissures. It is the excess of mercury left in these places that causes so many amalgam fillings to show defects at these points. After the mercury has been entirely removed, condense forcibly with burnishing motion, and dress down with pumice or silex and soft pine shaped to suit. When the filling is sufficiently hard, polish with pointed sticks of hickory or orange-wood, and pumice or silex.

The preparation of a cavity for an amalgam filling should be more thorough than for any other material. Cut as long as there is perceptible defect ; work for sound and reliable foundation. No pins or screws for support of filling are necessary ; a sufficient anchorage can always be obtained by properly-shaped undercuts.

He deemed it more important to bevel or countersink the edges of cavities than to depend on the edge-strength of the amalgam. There is no amalgam on the market except copper amalgam (which for several reasons he considered an undesirable material for filling teeth), which has an especial sharp edge-strength. He considered the use of bibulous paper for removing excess of mercury an absurdity. It is a safe practice to touch the walls of cavities with creasote before filling. Where there is near approach to pulp, concave a piece of lead of suitable thickness, fill with beeswax, place in the cavity convex side up, and press to position with a serrated instrument. Beeswax is non-irritating, non-conducting, and non-destructible. If the pulp is diseased, he seldom treats for restoration, but removes and fills the roots with beeswax and cotton fiber to the base of the pulp-chamber, covering with sheet lead and beeswax. He does not approve of the lining of cavities with any other material, but favors the brushing of the cervical portion of approximal cavities with a good article of gutta-percha, and thinks such a method equally applicable for gold fillings. The operation is as follows : Prepare the cavity, and especially the cervical section ; undercut for retention of material, gutta-percha ; fill the cavity one-fourth, one-third, or one-half full from cervical line to crown with gutta-percha ; do not condense ; and finish approximal face of gutta-percha until the amalgam is sufficiently hard for final finish.

Many fillings of amalgam and gold inserted by some of the best operators are found in a few years to be defective at the cervical line, especially when the approximal space had been restored by contouring. In such cases he obtains space by wedging, and fills with gutta-percha. For cervical portions of approximal cavities he regards gutta-percha filling as more reliable than any other material.

Dr. E. S. Chisholm read a paper entitled " Our Periodical Literature."

Dr. Chisholm expressed the opinion that dental periodical literature had been more effective in making the science and practice of dentistry what it is to-day than all other agencies combined. He considered most praiseworthy and encouraging the professional spirit exhibited by the eagerness with which every new idea, invention, or method was spread before the profession for the good of all. It is evidently the desire on the part of practitioners to be the first to tell that which others do not know, and thus make a common fund of knowledge from which all alike can draw. Dental journalism represents the circulatory system which carries the pabulum for the upbuilding of the tissues in the professional body. It is indeed the life-blood of dentistry.

Dr. W. C. Wardlaw read a paper entitled "The Therapeutic Treatment of Root-Canals."

He spoke briefly of the improved methods of treatment based on the investigations of Lister, Koch, Pasteur, and Miller, which had made dental therapeutics almost an exact science.

The operation of opening into a pulp-chamber, formerly considered as likely to result in peridental trouble, is now by the exclusion of the saliva and of atmospheric microbes, and the use of antiseptics and disinfectants, a perfectly simple procedure.

When on opening into a canal it is found empty and dry, and there is no record of peridental trouble, the indications are the removal of every particle of débris, and the rendering of the canal permanently aseptic. Cleanse the canal with a detergent, as alcohol, peroxide of hydrogen, or ammonia, using the syringe and not a cotton swab, which acts as a piston and may force septic matter through the foramen.

Evaporate the alcohol; and thoroughly dry the canal with a hot-air syringe. Then use a dressing of bichloride of mercury. In all cases where possible, enlarge the canals with the Gates-Glidden drill used in the hand and not in the engine, beginning with the larger and following with the smaller drills, going as far as can be done with safety. By this means better access can be had to the parts, all adherent tissues removed, a certain amount of infiltrated dentine-tissue cut away, the mouths of the tubuli opened, cleansing and filling facilitated, much time saved, and the tooth not materially weakened or injured by the operation. All particles of pulp-tissue must be removed from the pulp-chamber, and this can only be done with a bur; the chamber cannot be otherwise reached in every corner. With regard to the root-canals of the superior incisors, it is a mistake to attempt it at the basilar portion near the gum, because it is thus physically impossible to remove the pulp from the fan-like expansion of the chamber near the incising edge.

Great care should be exercised to avoid the passage of an instrument through the foramen, which might cause traumatic irritation or convey a remnant of septic matter.

The canal is to be rendered permanently aseptic by a dressing of iodoform, and subsequently carbolic acid. The opening into the canal should be kept well sealed, and after a few days' probation the foramen may be closed and the filling completed. If the canal is found to be filled with fluid contents, a thorough syringing with carbolized water will generally place the tooth in condition for reaming out and subsequent disinfection and filling.

In an open pulp-cavity containing partially devitalized pulp-tissue the same care must be exercised to cleanse, disinfect, and render aseptic. Peroxide of hydrogen will penetrate the tubuli and destroy the infectious contents, and carbolic acid will coagulate the ends of the living tissue in the tubuli.

In the case of an abscess having ensued from a dead pulp, similar treatment is indicated. In a tooth containing a surgically devitalized pulp, the indications are plain : remove, cleanse, asepticize, and fill.

The main consideration in all cases is to thoroughly seal the foramen,—not always possible, and it is difficult to tell when it has been certainly effected. It is therefore important to fill the canals,—it matters little with what, so they are properly filled.

Of the long list of antiseptics, disinfectants, germicides, etc., the essayist said he was satisfied with carbolic acid, bichloride of mercury, iodoform, listerine, peroxide of hydrogen, and Dr. Black's antiseptic.

Dr. W. H. Atkinson read a paper entitled "Advanced Methods of Practice."

Dr. Atkinson sketched briefly the origin and progress of dentistry and the researches as to the development of the teeth and the causes of their destruction, resulting in such a status in knowledge and skill as to make the most important function of the dentist to be to so care for the development, growth, and arrangement of the teeth as to preclude the necessity for restoration of parts of teeth or portions of sets. He considered the highest attainment in any specialty of the healing art is to so instruct the people that they shall not require a remedy ; that dentists should be entirely competent to prevent disease more often than to treat it. Prevention should almost supersede what is now understood as practice.

A first effort would be to prepare mothers to bear well-endowed children. Then the children should be under supervision as early as in their first year. From this point the remainder of the paper consisted chiefly of expressions of personal opinion upon matters of daily practice in the care of the teeth, beginning with instruction to mothers as to the care of their children's mouths. He does not ordinarily recommend powders in the child's mouth. When there are pits in the enamel they should be polished out. He approves of the use of carbolic acid soap as a cleanser, and considers that probably the most efficient and least dangerous mouth-wash we can give to children is a saturated solution of hydronaphthol in distilled water; and lime-water is the one admissible alkaline wash that is scarcely capable of doing mischief. Sandarac varnish is efficient in the repair of the highly-pitted teeth found in the mouths of children suffering from infantile dyspepsia. If it were faithfully applied as soon as the difficulty was found, the probability is that they would need nothing else ; it should be used thin enough to penetrate all the chinks and interspaces ; then have the alcohol washed out of it with water so as to allow it to seal up all the pitted and roughened surfaces. When acidity of the mouth and stomach is present, a correction of the tendency is best secured by nitro-muriatic acid,—five-drop doses in sweetened water. This double acid is a better corrective than the alkaline treatment by the use of the bicarbonate of soda or other antacid. All cavities of decay on the deciduous teeth should be promptly filled.

The strongest reliance in the treatment of carious teeth is to remove all the diseased and disintegrated parts, and thoroughly disinfect the cavity. He recommends a mixture of equal parts of creasote and oil of cloves for washing out every cavity before filling. The purpose in using the mixture is to get a modified effect of each ingredient in preference to the specific action of either. For cleansing pulp-chambers and canals in cases of dead pulps he recommends caustic soda, caustic potash, or a combination known as caustic paste,—crystallized carbolic acid one part, potassa fusa two parts, mixed into a paste.

For provisionary fillings he is limited almost entirely to sandarac varnish and oxyphosphate cement, using gutta-percha very seldom. Where pulps are living he protects them from thermal shock by lining the cavity with oxyphosphate, except immediately at the margins. He does not build masses of gold into teeth with living pulps, because of his conviction that the conductivity of gold is too great for the safety of the tooth. The skillful inlaying of porcelain in restoration of contour, set always in oxyphosphate cement, meets his approval, and where teeth are badly decayed he favors the use of gold crowns well fitted and cemented with oxyphosphate cement. Where the pulps are gone, the Logan crown meets the requirements better than anything else, mounted with a collar where the condition is favorable and the crown will set without impinging too much upon the dental ligament. He esteemed bridge-work, properly designed so as to secure neatness, lightness, and strength, as the most advanced method of supplying partial dentures. When the roots are gone, the bridge teeth should bear directly upon the gums. The cases are very few in which removable bridges are to be preferred to the permanent forms.

Dr. Atkinson expressed himself as opposed to all degrees other than certificates of advancement, stating the ground over which the individual has passed as preparatory to entering upon the further study and practice of any branch of the healing art.

In all cases of non-malignant growths he prefers the knife or other surgical instrument for their removal to the exclusion of caustics. In malignant growths he prefers the chemical or electrical cautery. He confines himself in practice, when a caustic is indicated, to caustic soda (London paste), caustic potash (Vienna paste), bichloride of mercury, and pernitrate of mercury, the latter being the most powerful and probably the most painful of any of the chemical cauteries. Before its application local anesthesia of the surrounding territory should be secured in any morbid growth of considerable size. All enlargements of mucous surfaces have an adenoid character, and he commended as a milder cautery salicylic acid in saturated solution in alcohol. This converts the epithelial structure and the outer part of the Malpighian layer without involving the corium and the vascular papilla. This agent should be applied successively so long as any of the morbid growth remains. Care should be taken when the converted portion has exfoliated to avoid breaking the capillaries in the papillæ. The red eyes of the papillæ may be seen pushing through the corium, until by successive sheddings the adenoid character of the aberrant growth is removed.

After the removal of an aberrant growth, where there is a sufficient amount of tissue, simple coaptation of the parts is all that is necessary to induce healing by first intention, but where the morbid growth has involved so much territory as to make it impossible to bring the adjoining tissues together without stretching them so much as to interfere with their nutrition, we must depend upon either sponge-grafting or granulation. Sponge-grafting is, indeed, a kind of granulation, for when the sterilized sponge is adapted to the chasm of the removed tissue, it should be filled with the exudates so as to have all the interstices so charged as to form a clot in which the protoplasm would be converted into granulation-tissue and thus supply the new growth.

Pyorrhea alveolaris is a local expression of deterioration that yields to escharotic treatment and constitutional tonics and depuratives much more readily than is generally accepted. The proper treatment is to use some agent that will dissolve the dead and dying part of the tissue, so as to set up a line of demarkation between the diseased and the healthy structure, and throw off by exfoliation that which would be scab if it were external where it would dry down.

Compound aromatic acid in full strength is a remedy which brings about restorations in a kindly manner. Caustic paste is a more active and powerful remedy, and in judicious hands is to be preferred even to the aromatic sulphuric acid. When a series of pockets are present, there should be a fixture attached to the teeth, leaving room for the granulations to grow up inside, which they will do when protected from the lodgment of foreign matter.

A paper entitled "Upward and Onward," by Dr. C. Johnson, was read by title.

Dr. G. B. Clements read a paper entitled "The Physiology, Pathology, and Treatment of Pulps and Root-Canals."

Dr. Clements said the canals of teeth-roots are as deceitful and deceiving as the will-o'-the-wisp. Every one has its own peculiarity. The canals of the different teeth will be found with the following variations:

Cuspids and incisors: Straight, crooked, and flat.

Bicuspids: Straight, bifurcated, and semi-bifurcated.

Molars: Straight, crooked, and flat.

In each class we have the combinations of straight and flat, straight and round, crooked and flat, crooked and round, bifurcated and crooked, semi-bifurcated and crooked, with many other combinations. Moreover, the operation of root-filling may be complicated by pathological conditions, such as pulp-stones and exostosis.

It is very important for us to know that the pulp of a tooth has a definite, palpable, and, in one sense of the word, a limited function; a definite function, because it has but one prime office to perform; a palpable function, because demonstrations prove it; a limited function, because in a given period it performs its duty and in one sense of the word becomes a passive organ, and can be taken away without serious detriment to the tooth-structure proper.

The teeth of the rodentia, from a necessity of nature, retain a persistent pulp. They have an open terminus at the apex, and continue to grow as they are worn off. If the apices of such teeth were closed, and only the minute foramina left as in human teeth, the necessary amount of nutrition could not be supplied to the structure, and the entire class of rodentia would exhibit a peculiar type of mechanical abrasion. These pulps are persistent, continuing their function through life, and the death of the pulp would involve the loss of the tooth. The pulps of human teeth have a limited function, consequently contracted foramina. They complete their work in a given time. After the work is done the servant is at rest. Nature does not call in her army of irritants and exert her expulsive forces to drive it out because it has finished its work, but in the osseous castle which the little organ has builded it is allowed to remain. She practically closes the door of nutrition, allowing only enough to sustain life. In this condition the pulp remains impassive, susceptible only to idiopathic disturbance or traumatic invasion.

After the duty of the pulp is fulfilled and the tooth is complete, any other effort on its part to form dentine is pathological, and will result in its death. It actually commits suicide. Secondary action in the pulp results in pulp-stones and strangulation, as the same action in the peridental membrane results in exostosis.

Upon the death of or injury to the pulp we can and do extract it in toto, and when we do we must fill the vacuum. There are many materials which have been used to fill root-canals, and with varying success. The method he wished to introduce he called the feather process, and described it as follows :

Never use a bur or drill in the canal of a tooth if possible to avoid it, and never open with bur or drill beyond the floor of the pulp-chamber. Expose each canal perfectly before entering it. Use broaches and root-canal cleansers, being careful not to force any débris through the apex of the root. Wash out successively with tepid water, peroxide of hydrogen, and dilute alcohol, and be sure to get the canal dry.

As a filling-material he recommended virgin gutta-percha dissolved in chloroform, filtered, with oxide of zinc added to make a cream. To introduce the material he uses a feather trimmed close from tip to bottom. This will follow almost any canal, and the beard upon each side pointing upward acts as a first-class carrier. There is no danger of employing too much force. It will not only carry filling-material, but may be used to carry medicaments through the canal and into the sac of an abscess. Of course the feather must be made thoroughly aseptic by being soaked in a solution of bichloride of mercury.

When the canal or canals have been pumped full, he takes a peg of fat pine, shaped to fit the canal as nearly as possible, which has been dipped in carbolic acid, dried, and then dipped in the chloro-percha mixture. He forces this gently into the canal and cuts it off. He thinks that the less the canals are drilled or medicated, the better the chance of success.

Dr. D. R. Stubblefield contributed a paper as a discussion of Dr. Atkinson's essay on "Advanced Methods of Practice."

Dr. Stubblefield said that he desired to ask the attention of the association to two sentences in a private letter from Dr. Atkinson accompanying the transcript of his paper which had been sent him some days in advance of its reading. These were, "It is discussion that makes an essay valuable, either by intensifying facts contained in it, or by exposing fallacies that it may advance," and "I wish a rule would prevail to require at least a synopsis to be furnished of every essay two weeks previous to its reading, so that copies could be distributed and full prepared discussion be had on all essays presented."

Dr. Stubblefield elaborated these suggestions at considerable length, urging the importance of the adoption of such a rule as that proposed, and in this connection digressed to pay a deserved tribute to the example of Dr. W. H. Morgan, the father of the Southern Dental Association.

In further commenting upon the several points suggested in Dr. Atkinson's paper, he took occasion to express very decided objection to the position of the paper regarding bridge-work. He thought that we are hastening to an extreme from which sooner or later good judgment must urge return. While admitting that bridge-work has undoubtedly a place in practice, he believed that a great deal of injudicious work was being done in this direction, the results of which would be unsatisfactory alike to the patient and the operator. There will be a reaction, as there has already been from the unphysiological implantation furore, which, despite the warnings of the conservative element of the profession, had its brief day. Dr. Stubblefield also took decided exception to the suggestion of the essayist regarding the advice to be given to mothers as to the exercise of the jaws and teeth of their children. He believed in the value of legitimate exercise of the teeth,—the chewing of substances that require muscular effort,—but did not believe this should include the cracking of nuts with the teeth; on the contrary, he thought such efforts an abuse which should be cautioned against.

Dr. Crawford said that the study of the nerve-canals and of the best manner of preparing and filling them was more necessary now than ever before, because the extensive use of crown- and bridge-work made it absolutely essential that the roots should be treated so there would be no necessity of removing these structures for after-treatment. We must treat the roots so as to make them permanent supports for the new structures.

Dr. Chisholm offered a resolution recommending all members of the Southern Dental Association to join the Dental Protective Association. Referred to the Committee on Resolutions, and on their reporting favorably adopted.

Dr. W. H. Richards, of Knoxville, Tenn., said that the Southern Dental Association had passed the twenty-first year of its life and was still without a dollar's worth of property of any kind. It has no library, no museum, no place it can call its home, and he desired the association to take into consideration the desirability of inaugurating a new state of affairs in this regard. He thought the Chautauqua idea would be a good one, that the association should secure some suitable place where the annual meetings might be held, and the following were given as some of the advantages to be gained by this course :

1st. The sessions would be extended to thirty days, thereby giving ample opportunity for carrying through in detail all clinics, lectures, or mechanical procedures.

2d. For the collecting of a library.

3d. For collecting specimens for a museum.

4th. To have a series of lectures upon dentistry and so much of the collateral sciences as pertain thereto, thus year by year raising the standard of dentistry by offering a post-graduate course to all members of the Southern Dental Association.

5th. To so locate this place of meeting as to make it desirable as a health and pleasure resort and accessible to the greater number of members, thus inducing dentists to bring their families.

The money necessary to carry out the enterprise would be a free-will offering to the Southern Dental Association, to be used to carry out the above idea. Quite a handsome sum had been proffered already toward starting the plan.

Upon motion, a committee of one from each State represented in the membership of the Southern Dental Association was appointed by the president to look up and select a site suitable for the purpose, of which committee Dr. W. H. Richards, of Knoxville, Tenn., was made chairman. The other members of the committee are Drs. W. H. Atkinson, New York ; H. J. McKellops, St. Louis, Mo. ; J. Taft, Cincinnati, O. ; W. H. H. Thackston, Virginia ; V. E. Turner, North Carolina ; G. F. S. Wright, South Carolina ; B. H. Catching, Georgia ; A. Eubank, Alabama ; G. N. Rembert, Mississippi ; W. R. Clifton, Texas ; C. E. Kells, Louisiana ; M. C. Marshall, Arkansas ; B. Holly Smith, Maryland ; —— Edwards, Florida ; Jno. J. R. Patrick, Illinois.

Adjourned.

In the evening the members met at a banquet in Concordia Hall.

FOURTH DAY—*Morning Session.*

The association was called to order at eleven o'clock. President Storey in the chair.

After the exhibition of new appliances by several members and the transaction of considerable routine business, Dr. George S. Staples read a paper on "Dental Hygiene," the principal features of which are incorporated in the discussion which follows.

Dr. W. T. Poole remarked upon the general ignorance among the public in regard to the subject of the paper, and said if the people would give the proper care to their teeth the dentists now in practice would not be able to do one-tenth of the work required. He thinks it the first duty of the dentist to do all in his power to impress the people with the necessity of preserving these organs, and to educate them, especially the young, in the proper care of the mouth and teeth. Too many are content to utterly neglect them till the teeth ache, and then the popular remedy is extraction, thus inflicting an irretrievable loss upon themselves which might and should have been avoided by proper care. The subject should be taught in the schools, and dentists should exert their influence to have it so taught.

Dr. B. H. Catching said that the Georgia State Dental Society had prepared an address to the public upon the care of the teeth, and at their recent meeting had ordered a number of copies printed and distributed to the dentists in the State for them to give to their patients. Such an address, or an occasional lecture by a dentist, would do much for the proper education of the people, and he favored the fullest use of such means.

Dr. W. J. Barton thought that the introduction of the study of dental hygiene in the schools would work more advantage to the public than any other means of educating them. It is necessary that the teeth be cared for during the years of school age, and the attention called to the subject in the school would move the pupils to practice the necessary care.

Dr. T. E. Beach said that the only feasible way in which we could effect anything toward the enlightenment of the public would be to have a lecture or series of lectures prepared and distributed by the authority of this body to physicians and educators. The authority of the Southern Dental Association would do more toward establishing confidence in the recommendations in the address than the name of any one dentist.

Dr. Staples agreed with Dr. Beach. He said if the dentist helped to circulate a pamphlet prepared under the authority of the association it would not savor of advertising like one circulated by a dentist as coming from himself personally, and would exert more influence as coming from such a body rather than from a single person.

Dr. J. L. Mewborn moved that a committee be appointed to prepare a paper to be used as suggested by Drs. Staples and Beach, and that this committee be instructed to report at the next meeting of the association. Motion passed.

Dr. J. J. R. Patrick, of the Committee on Clinics, spoke in regard to the crown which he had made in the clinic. He said that one of the first requisites to successful work was a complete outfit of tools, and the next was the knowledge of how to use the tools. He was often surprised at the way some practitioners and students managed to construct crowns for teeth with a very inadequate set of tools. Many instructors in dental colleges seemed to think it best to teach the students to use as few appliances as possible. He did not think this a good policy, but would always teach the necessity of having all the helps in the way of tools that would either save time or produce more perfect work. Dr. Patrick then showed by the aid of the blackboard the necessity of studying the anatomy of the teeth when adjusting crown- and bridge-work, and the advantages gained by undercuts in adjusting bands for this purpose. The part of the tooth receiving the band should be inclined in such a way that the leverage exerted by the forces of mastication will tend to force the crown on tighter rather than loosen it.

After election of officers and the selection of the time and place of next meeting, the results of which were published in our September issue, the association adjourned.

Report of Clinics.

The clinics were under the direction of Dr. Robert K. Luckie, superintendent, and Dr. J. A. Thornton, assistant.

Dr. C. S. Stockton, Newark, N. J., exhibited Ward's electroplate, dentures made by depositing pure gold and silver directly upon the model, thus securing a perfect fit. In the event of a break, it can be easily repaired.

Dr. W. H. Marshall, Oxford, Miss., demonstrated Marshall's matrix in filling two compound cavities in the left superior bicuspids with tin and gold, finished with gold.

Dr. D. Genese, Baltimore, exhibited a new porcelain crown. It has a hole in the base, lined with platinum burned in. This hole approximates the root-canal ; the root is trimmed to fit the crown, giving it the desired position ; the pin is placed in the root, the hole in the crown is filled with wax, then the crown is placed on the root and withdrawn, bringing with it the pin. All is invested, the wax melted out, and the pin soldered into the crown. He placed two of these crowns.

Dr. B. H. Teague, Aiken, S. C., exhibited Teague's dental impression compound, showing its superiority over plaster. He demonstrated the taking of impressions of roots for crown-work, pouring into the impression, while still wet, fusible metal, getting a die within three minutes ready for the band. He also demonstrated the making of a model with the same material, for the purpose of casting a metal die, either zinc or Babbitt metal. He tested the same material as an investment for soldering at the high heat necessary to fuse teeth, putting it in a baking furnace without effecting a change or producing cracks in the material, fusing gum-body in it completely. He also polished rubber plates and gold crowns by use of his sand-paper chuck.

The S. S. White Dental Manufacturing Company, Philadelphia, Pa., exhibited (1) the Parker furnace, a small, compact furnace with a cupola top, using gas for fuel, with the aid of a bellows worked with the foot. Tooth-body and enamel are readily fused in four to six minutes, demonstrating the value of this furnace for making continuous gum of plain teeth, and also for porcelain inlays. (2) An electrical motor (claim, increased efficiency and control of the current in the system known as Dr. Kells's). The regulation of speed has been provided for to a nicety, and is practically all that can be desired, while absolute and immediate control of the bur is secured, its revolutions being instantly suspended at the will of the operator. The regulation of speed is secured by a variable resistance in combination with an additional resistance when a lamp or plugger is used. The rotation of the bit is stopped by a friction-brake, controlled by the current, operated by the foot. The motor swinging-bracket carrying the engine-arm, and the conducting and connecting wires and cords, are all compactly appended and attached to a neat cabinet arrangement, which is ready to be placed in a dental office, requiring only the attachment of the wires carrying the current from the street. The Kells system is applicable only to the Edison incandescent current, the alternating and arc currents not being applicable to such uses. In addition to the devices alluded to as the Kells system, there has also been introduced a wall-bracket electric suspension engine, which gives a free movement, both perpendicularly and horizontally, to the hand-piece, which is operated by a short section of a sleeve-cable, freeing the hand-piece of all extraneous weight. The new cord engine has been adapted for the use of the electric current by being placed upon a tripod base supporting the electric motor, which drives a small counter-pulley, transmitting increased power and increased speed at the will of the operator. The same motor which is employed for the suspension engine and the cord engine is applicable to the laboratory lathe. A mouth-illuminator attached to a universal bracket-arm, connected with the head-rest of the chair and capable of all necessary movements, is another valuable adjunct.

Dr. L. Parmly Brown, New York, exhibited a revolving upright dental cabinet to be placed behind the operating-chair and accessible from either side. It is an upright octagonal, provided with a sliding shell, which can be raised, exposing all the instruments to view, with points up, in cups and racks made for the purpose. It is also provided with drawers at the base, and a medical department at the top. The shell, when down, completely covers everything, it and all the drawers being locked with one key. It is the invention of Dr. Brown. (2) A depressed rubber-dam, which takes the form of the face as well as of the mouth, and obviates all dribbling and escape of saliva, giving free access to the operation without any wrinkles. (3) An improved porcelain crown, designed to be attached to roots without any cutting or fitting. It is made with a doubled tapered pin, tapering in the porcelain as well as in the root.

Dr. Joliffe, Baltimore, exhibited a blind, specially adapted for dentists' operating-windows. It is strong, durable, light, and handsome, so arranged as to be easily adjusted for either blind or awning, giving light and air in abundance, and excluding the sun's rays.

Dr. T. M. Hunter, Fayetteville, N. C., demonstrated (1) the extraction of deep-seated roots, and roots over which crowns lean, by inserting How screw-posts, and removing with small-nose pliers or forceps pinching the posts ; (2) the application of the rubber-dam to roots for crowning, etc., using the root-clamp and two half-hitches for ligature ; (3) the application of Spurgeon's matrix to teeth in various positions. (4) He filled a buccal cavity in a right inferior first bicuspid, varnishing the cavity with sandarac, drying and placing cement, finishing with velvet cylinders and semi-cohesive gold ; (5) demonstrated the adjustment of trays for taking impressions with modelling composition,—ten cases ; (6) filled inferior right lateral incisor, proximate surface, showing anchorage in small, thin teeth, using non-cohesive cylinders, and finishing with semi-cohesive gold contouring.

Dr. A. H. Gilson, Boston, Mass., demonstrated a method (presented to the profession by Dr. Geo. A. Maxfield, of Holyoke, Mass.) of uniting the ends of the engine-band. Either end of the band must overlap about six inches. The ends are then drawn into the body of the belt, from this point, each way, by passing a small wire hook through the side into the hollow of the band opposite the end of the overlapping part, and pushing it along through the center lengthwise, to the point to be joined when the hook is exposed again, then the opposite end of the band is passed through the loop and drawn by the hook into itself the required distance, and the other end of the band is screwed in the same way. He also showed his strips and disks for finishing fillings.

Oral Clinic.

Dr. J. Y. Crawford, Nashville, Tenn. Treatment of temporary teeth. First patient, a girl eleven years of age ; overlapping, the result of an irregular extraction of the temporary teeth on the right side. He advised filling the cavities and fissures of the sixth-year molars, and the removal of the deciduous teeth within the next twelve months. He further advised the correction of the irregular permanent teeth by wedging the parts, and irritating them in their sockets. (2) He also exhibited on a boy, nine years of age, the manner of extracting a deciduous tooth at once without pain.

Dr. R. Ottolengui, New York, exhibited albumen placed in tubes, adding various drugs used by the profession in treating root-canals, in order to demonstrate which are coagulants, and therefore not to be used in the treatment of pulpless teeth. The coagulants shown were spirits of camphor, tincture of iron, iodine, alcohol and hydronaphthol, creasote, tannin and glycerine, iodoform, salicylic acid, wine of opium, tincture of opium, potash, chloride of zinc, listerine, peroxide of hydrogen, aromatic sulphuric acid, and tincture of myrrh. The non-coagulant's were liquid vaseline, menthol, oil of turpentine, oil of sassafras, vaseline and menthol, oil of cloves, and oil of cassia. The doctor advised the use of non-coagulants in root-canals in place of remedies more commonly in use. Dr. Ottolengui also implanted a second right superior bicuspid in the mouth of Dr. D. D. Lester, of Christianburg, Va. He first demonstrated sterilization, scrubbing with tar soap up to the elbows, then rubbing with menthol and benzoic acid and liquid vaseline, next scrubbing with borax in water and tar soap, lastly thoroughly washing in hydronaphthol ($\frac{1}{300}$ in water). After each washing the nails were cleansed with a spray atomizer; the mouth of the patient was cleansed with hydronaphthol. With a tubular knife a circular incision was made in the gum, the piece thus isolated being dissected with a bistoury. A hole was drilled into the bone the desired depth, which had been gauged on his reamer. This socket was widened at the lower margin with a larger reamer, and was then ready to receive the tooth. After setting the tooth (the hands having been once more scrubbed and sterilized), a continuous gold splint was swaged up to cover the two bicuspids and first molar, to which it was fastened with cement. Before and during the operation the instruments were sterilized and left in hydronaphthol. The socket was never left open, but always packed with sponges; thus there was little loss of blood.

Dr. J. L. Mewborn, Memphis, Tenn., operated with his own attachments to the dental engine known as the Mulley mallet, and his attachment on the Bonwill mallet, showing his method of reinforcing hand-pressure in condensing gold. These attachments obviate the necessity of changing the bits, as in using the old hand-plugger. The instruments are grasped close to the end, thereby securing better control while in motion, at the same time enabling the operator to make desired lateral or rotary motion in any direction. Two thousand blows per minute are readily made. He inserted a large compound gold filling in the right superior second bicuspid and first molar for Dr. J. J. Worsham in twenty-seven minutes, the cavity having been prepared in twenty minutes. He filled with gold the mesial and cutting surfaces of the left superior central, also the mesial, distal, and cutting surfaces of the right superior central, and the mesial surface of the right lateral, in about two hours' time. In these operations he was ably assisted by Miss Annie Davis.

Dr. Geo. Evans, New York, demonstrated his method of treating pulpless teeth, using heat in connection with his root-canal drier, and saturated solutions of iodoform in ether as an antiseptic. He also demonstrated his methods and instruments for trimming crowns. The instrument consists of a cone-shaped bur, for use in the dental engine, and a pyramidically-pointed instrument for use in the hand. He likewise demonstrated his method of forming anchorage for crowns in badly broken-down roots with the use of silver wire cemented in the roots, the coronal section of the broken-down root being partially restored with amalgam.

Dr. W. H. Richards, Knoxville, Tenn., exhibited an instrument for bleaching teeth and treating abscesses. His method is as follows: Open up the canal and place the cone in it. A tight joint is thus secured. The syringe being charged with peroxide of hydrogen, compress the bulb and force the fluid through the root and out of the fistulous opening. Then pass eugenol into the anterior tube of the syringe filled with water, which carries it into the abscess. For bleaching teeth the same instrument is used. With it the anterior tube can be separated from the other. In the bulb is placed a solution of alum and lime. The solution is forced into the lymph and the chlorine is set free, which bleaches the teeth. An advantage claimed is that by the customary method the roots are perfectly dry, but by this method the roots are wet with a solution of campho-phenique and iodoform. The amount of iodoform is what would be held on the point of a penknife to a drachm of campho-phenique. The next step is to pack the root with a fibrous tin preparation. This is done with the Donaldson nerve-broach, to which the fibrous tin adheres, and when passed into the cavity, owing to the dampness (to which allusion has been made), the particles are retained and packed in place.

Dr. H. C. Herring, Concord, N. C., demonstrated the anesthetic properties of cocaine for the painless extraction and implantation of teeth. He stated that when used hypodermically it was the most dangerous drug in the whole pharmacopœia, and that one-eighth of a grain was quite sufficient to produce perfect anesthesia. He admonished all to keep their syringes clean and in a thoroughly aseptic condition, and in the event of toxic symptoms to always have at hand the proper remedies. He claimed that it should never be administered to neurotics, to persons who are afraid of it, or when the stomach is empty. A full stomach or a glass of brandy fifteen minutes before it is used will induce the most satisfactory results. The heart is thus toned up to its fullest capacity, and it would require an extra dose or a powerful cardiac depressant to counteract it. He used one-eighth of a grain on the buccal side of a superior molar, and in about four minutes Dr. J. Y. Crawford made a painless extraction.

Dr. C. L. Alexander, Charlotte, N. C., constructed perhaps the most extensive bridge ever made at any of these meetings. The case was a continuous piece, and consisted of ten teeth. The abutments were the second molar and two cuspids. The attachments of the porcelain facings were both original and unique. The teeth were not subjected at all to the heat of the furnace and blow-pipe, consequently there was no fracturing or crazing. A circular opening was made to admit the pins, which when placed in position were bent and the place filled with amalgam. In the event of a tooth breaking off, another can be easily adjusted without any disturbance to the piece.

Dr. J. J. R. Patrick, Belleville, Ill., bridged from the left lower first bicuspid to the second molar, crowning each tooth, and using his machine for swaging and contouring the crowns. The patient was Dr. W. C. Wardlaw.

PENNSYLVANIA STATE DENTAL SOCIETY.

AT the twenty-second annual meeting of the Pennsylvania State Dental Society, held at Minnequa, Pa., July 29, 1890, the following officers were elected for the ensuing year:

L. Ashley Faught, Philadelphia, president; W. H. Fundenburg, Pittsburg, vice-president; J. L. Fordham, Scranton, second vice-president; C. V. Kratzer, Reading, recording secretary; J. C. Hertz, Easton, assistant recording secretary; H. Newton Young, Wilkesbarre, corresponding secretary; G. W. Klump, Williamsport, treasurer; Frank L. Bassett, Philadelphia; J. C. Green, West Chester; C. S. Beck, Wilkesbarre; J. A. Libbey, Pittsburg; Howard E. Roberts, Philadelphia, executive committee.

H. NEWTON YOUNG, *Corresponding Secretary*,
Wilkesbarre, Pa.

MINNESOTA STATE DENTAL ASSOCIATION.

THE annual meeting of the Minnesota State Dental Association was held at Minneapolis, Minn., commencing July 9, 1890, the sessions continuing for three days.

The following officers were elected for the ensuing year: M. G. Jenison, president; W. C. Merrill, vice-president; L. D. Leonard, secretary; H. M. Reid, treasurer; E. F. Clark, chairman of executive committee; Charles A. Van Duzer, master of clinics.

L. D. LEONARD, *Secretary*,
No. 73 Syndicate Block, Minneapolis, Minn.

GRAND UNION MEETING IN BOSTON.

THERE will be a grand union meeting held in Boston, Mass., October 28 to 31 inclusive, 1890, participated in by the following societies: New England Dental Society, the several State societies of New England, the American Academy of Dental Science, Harvard Odontological Society, Connecticut Valley Dental Society, Harvard Dental Alumni, Boston Dental College Alumni Association, Boston Society for Dental Improvement, and the Worcester Dental Society. The committees are arranging for a very enthusiastic meeting. A cordial invitation is extended to all reputable members of the profession to attend.

EDGAR O. KINSMAN, D.D.S., Secretary N. E. D. S.,
15 Brattle Square, Cambridge, Mass.

UNION CONVENTION OF SOCIETIES IN NEW YORK STATE.

A UNION Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York will be held in Rochester, N. Y., commencing October 28, 1890, and continuing for three days.

W. F. ARNOLD, *Recording Secretary*,
No. 235 E. Main street, Rochester, N. Y.

CENTRAL AND WESTERN ILLINOIS DENTAL SOCIETIES.

THE first union meeting of the Central and Western Illinois Dental Societies will be held at Galesburg, Ill., commencing October 14, 1890.

An invitation is extended to all dentists in the State or elsewhere to be present. A fine programme of essays and clinics has been arranged.

O. M. DAYMUDE, Monmouth, Secretary Western Society.
E. K. BLAIR, Waverly, Secretary Central Society.

NORTHERN ILLINOIS DENTAL SOCIETY.

THE next annual meeting of the Northern Illinois Dental Society will be held at Rockford, Ill., on Wednesday and Thursday, October 15 and 16, 1890.

T. W. BECKWITH, *Secretary*,
Sterling, Ill.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE twenty-third annual meeting of the American Academy of Dental Science will be held in Boston, on Wednesday, November 12, 1890.

The annual address will be delivered by W. H. H. Thackston, M.D., D.D.S., of Farmville, Va.

EDWARD N. HARRIS, D.D.S., *Corresponding Secretary*,
No. 2 Park Square, Boston, Mass.

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EDITORIAL.

THE OBLIGATIONS OF SPECIALISM.

CONCENTRATION of thought and devotion to the practice of a single branch in law, medicine, manufacture, music, or any other calling, profession, or pursuit, is naturally expected to develop a special fitness in the individual who thus limits his sphere of activity.

The practice of law is subdivided, and great reputations are made in certain well-defined fields in which the practitioner is assumed to be thoroughly informed.

In medicine a like subdivision is the natural outgrowth of the conviction, both in the profession and in the community, that higher ability and skill result from such concentration. Thus, gynecology, dermatology, ophthalmology, otology, and other branches of medicine and surgery are represented by men who come to be known as specialists. The comparatively recent rapid advance in all branches of medicine is due doubtless to this limitation of the field of special study and practice. It needs no argument to prove that thus only can the highest results in accuracy of diagnosis and in perception of the therapeutic, surgical, or mechanical indications, or in facility of manipulation be attained. Undivided attention to particular organs must eventuate, other things being equal, in a keener appreciation of their histology, physiology, and pathology, and a special practice, based on a special study, must develop a higher skill.

While it is apparent that there can be no dividing line in the chain of physiological or pathological action, by which any portion of the economy may be assumed to be a law unto itself and to be independent of systemic relation, yet it is manifest that the expressions of inharmony in a particular organ or in a circumscribed area of the body are, to a certain extent, dependent upon the character and function of the tissues involved, and that lesions of these tissues may be more advantageously studied and treated from the stand-point of the specialist than from that of the general practitioner. It must be assumed, however, that intelligent specialism can be based only on a broad and thorough general education. Those basal principles denominated the Institutes of Medicine can be apprehended only by a profound study of the laws of life.

To apply these facts to the education of those who are proposing to enter the ranks of the practitioners of dentistry, is but to emphasize the necessity for a culture which will enable them to take position as specialists entitled to the doctorate. Mechanical skill and artistic taste, however desirable and necessary, cannot be accepted as a demonstration of the qualification which is demanded. If dentistry is to be acknowledged as a specialty worthy to rank with other recognized specialties of the healing art, it must show a breadth of culture in its chosen field equal to that demanded of other specialties in theirs.

It is unimportant for the purpose of this writing whether dentistry be called a specialty of medicine or an independent profession. The public will claim, naturally and righteously, all the advantages to be expected from special training and special practice. If extraction and filling of teeth, the correction of irregularities, and the construction of prosthetic devices be accepted as defining the qualifications of the dentist, then the sooner the term "dental mechanic" or "dental artisan" be substituted in place of "doctor" the better.

Such limitation, however, is not desirable, and there is abundant reason in the nature of things for a broad medical culture and a special training for the duties and obligations of the practitioner of dentistry. The young men now entering the ranks should clearly understand that there cannot be any middle ground ; they will inevitably be assigned their true position, either as mechanics or doctors. If mere mechanics are sufficient, dental colleges are misnamed. Mechanical skill—manipulative dexterity—is of course essential, but by no means answers all the requirements.

Dental colleges should hereafter graduate no man who is not able to diagnose intelligently any tumor or lesion of the mouth, whether he elect to operate or not, and who is not capable of treating properly any case of fracture of the jaw, or who cannot give a sound opinion and judicious advice with regard to any lesion of the oral cavity or any lesion dependent upon direct or sympathetic relation with the mouth or teeth. From the diseases incident to the first dentition to the direct and associated difficulties of the edentulous mouth of old age, he should be an expert in diagnosis and in correction of the disturbances and discomforts connected with any abnormal condition of the oral cavity.

Quoting from a former editorial on the same line of thought: Let not those who entered the profession in its infancy and who have helped in its honorable exaltation repine should its rapid advancement leave them in the rear, but rather rejoice that the calling to which they gave their best endeavors "when days were dark and friends were few" is being lifted to a higher plane and a more secure position in the great circle of medical science.

THE KANSAS DENTAL LAW SUSTAINED.

THE Supreme Court of Kansas has given a decision sustaining the validity of the dental law of that State. Dr. E. H. Creditor was practicing dentistry in another State, and came to Kansas after the dental law went into operation. He was promptly informed by the State board that he was ineligible to practice, not having a diploma. He denied the validity of the law, and continued practice. The matter was brought before the lower court, which decided that the law was valid and in force. Dr. Creditor appealed, and the Supreme Court has now unanimously affirmed the validity of the Kansas law.

JOURNALISTIC CHANGES.

DR. W. X. SUDDUTH, in the July number of the *International Dental Journal*, announced his relinquishment of its editorial and business conduct, and his acceptance of an appointment as professor of pathology and oral surgery and secretary of the dental faculty in the University of Minnesota.

In the August number of the *Journal*, Professor James Truman, chairman of the advisory committee of the International Publication Company and dean of the dental department of the University of Pennsylvania, assumed editorial control. The new incumbent is sufficiently well known to the profession to preclude the necessity for more than mere mention of the fact above stated.

DR. H. C. WOOD'S ESSAY ON ANESTHESIA.

THE most recent and a very valuable contribution to the literature of anesthetics and anesthesia is that of Prof. H. C. Wood, of Philadelphia, read before the International Medical Congress at Berlin, and published in full in the current number of the COSMOS. We commend its careful perusal to all who administer anesthetics.

CORRECTION.

DR. W. D. MILLER writes : "I see that in my article in the August COSMOS, page 603, among those substances pre-eminently active in preventing decomposition of the pulp I have mentioned oil of cloves. It should have been oil of cinnamon."

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BIBLIOGRAPHICAL.

A SYSTEM OF ORAL SURGERY : Being a Treatise on the Diseases and Surgery of the Mouth, Jaws, Face, Teeth, and Associate Parts. By JAMES E. GARRETSON, A.M., M.D., D.D.S., President of the Medico-Chirurgical Hospital, Dean of the Philadelphia Dental College, etc. Illustrated with numerous wood-cuts and steel plates. Fifth edition, thoroughly revised, with additions. Large octavo, pp. 1364. Philadelphia : J. B. Lippincott Co., 1890. Price, cloth, $9.00 ; sheep, $10.00.

The four previous editions of this volume have been noticed, as they appeared, in the pages of the DENTAL COSMOS. Of this fifth edition, whatever has been heretofore said commendatory receives additional emphasis because of the further elaboration of the subjects discussed and the addition of new matter made necessary by the advance of the specialty. Earnest effort has apparently been made not alone to condense, but to systematize and to make the teachings more practical and easier of comprehension by the student. The various topics are discussed under seventy-eight chapter headings, the leading features of each chapter being elaborately detailed under the general headings in the table of contents, while an exhaustive index,—one of the most complete we have ever seen,—occupying forty-two double-column pages, enables the reader to find instantly any subject treated of in the volume.

The author in his preface assumes dentistry to be not a profession in itself, but part of medicine at large, and argues that where medical knowledge is lacking dentistry is of little use to a community. Accordingly, large space is devoted to the consideration of other than purely dental lesions, though by no means to the exclusion of a full presentation of operative and laboratory procedures. In fact, while it might be claimed that undue attention has been given to subjects not strictly within the limits of even such an extension of dentistry as might properly be included under the term oral surgery, there is no occasion for the criticism that dentistry proper in any of its departments or relations has been slighted.

A somewhat careful examination of the book has failed to show any dental subject which has not received full treatment and reasonable illustration.

Nearly forty years of devotion to dentistry and to oral surgery from the stand-points of practitioner, professor, and author has afforded an experience the outcome of which it is apparent that the writer has earnestly and conscientiously striven to present in the volume before us ; and although some of his theories, some of his conclusions, and some of his methods may be open to question, no one, we think, will contend that he has intentionally failed to embody in this work all the knowledge upon the numerous topics discussed which he has been able to acquire.

The manual dexterity required of the dentist peculiarly prepare him for the proper performance of all oral operations, and to this experience is doubtless in large measure due the recognized proficiency of the distinguished author, who stands easily at the head of oral surgeons in the number, extent, and character of such special operations. Hence the exceptional value of this work to the general surgeon, and of course also to medical practitioners who would be thoroughly prepared for the exigencies of country practice. For almost every contingency there are provided, with profusion of illustrative detail, simple instructions for the construction or application of mechancal adjuncts or appliances as accessories to operations.

Chapter seventy-three, upon medical diagnosis, "being preliminary to the study of anesthetics and anesthesia and appreciation of disease in general," and chapter seventy-six, upon inflammation, we commend as specially worthy of most careful study by all who aspire to practice dentistry from the medical stand-point.

In conclusion, to use an expressive current phrase, it goes without saying that Dr. Garretson's work under review is without a rival in its comprehensive treatment of the subjects indicated on its title-page.

Of the publishers' part we need only say that their reputation is a sufficient guarantee of excellence in their department.

ESSENTIALS OF ANATOMY AND MANUAL OF PRACTICAL DISSECTION, together with the Anatomy of the Viscera. Prepared especially for Students of Medicine. By CHARLES B. NANCREDE, M.D., Professor of Surgery and of Clinical Surgery in the University of Michigan, etc. Third edition, revised and enlarged, based upon the last edition of Gray's Anatomy. With 30 handsome full-page lithographic plates in colors, and 180 fine wood-cuts. 12mo, pp. 372 and index. Philadelphia : W. B. Saunders, 1890. Price, cloth, $2.00.

We have in this volume a reliable guide to dissection and a clear and admirable manual of anatomy. The illustrations and descriptive matter, based upon the last edition of Gray, are amply sufficient for a ready and adequate comprehension of the anatomy of the viscera, the relative position of the deeper organs, the relation of the principal blood-vessels of the thorax and abdomen to the osseous skeleton, and the essentials of anatomy generally. It is certainly, as claimed by the publisher, the most exhaustive, yet concise, students' manual of anatomy ever published, either in this country or Europe. It must be indispensable to the student for daily and to the practitioner for convenient reference.

A COMPEND OF CHEMISTRY, Inorganic and Organic; including Urinary Analysis. By HENRY LEFFMANN, M.D., D.D.S., Professor of Chemistry in the Pennsylvania College of Dental Surgery, etc. (Quiz Compend No. 10.) Third edition, revised. 12mo, pp. 193. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $1.00; interleaved for taking notes, $1.25.

The author of this Compend tersely expresses the facts in his preface, as follows:

"Books of this class do not always meet with favor at the hands of reviewers; but anyone who has had experience in teaching at American medical colleges knows that as long as the present methods continue, some such assistance is absolutely essential. It affords to the student an opportunity to keep up with the lectures, and obviates the necessity of taking voluminous notes, in which serious errors are liable to occur. Such books, of course, cannot claim any originality; their merit lies in their accuracy, perspicuity, and judicious selection of facts."

The volume is an excellent specimen of its class.

THE ESSENTIALS OF MEDICAL CHEMISTRY AND URINALYSIS. By SAM E. WOODY, A.M., M.D., Professor of Chemistry and Public Hygiene, and Clinical Lecturer on Diseases of Children, in the Kentucky School of Medicine. Third edition, revised, enlarged, and illustrated. 12mo, pp. 157. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $1.25.

We cannot do better than allow the author to speak for himself in explanation of the object of this volume. We quote from the preface:

"As long as the effort is made to crowd the whole science of medicine into a five months' course, the hurried student must have such a book as this to present the *essential facts*, so that he need not wade through the more exhaustive text-books, or be compelled to take voluminous notes, which are unavoidably inaccurate and unsatisfactory. The selection of material and the plan of presentation is the outgrowth of the author's experience as a general practitioner and as a teacher of medical chemistry for the past twelve years."

A COMPEND OF DENTAL PATHOLOGY AND DENTAL MEDICINE, containing the most Noteworthy Points upon the Subjects of Interest to the Dental Student. By GEORGE W. WARREN, D.D.S., clinical chief, Pennsylvania College of Dental Surgery. (Quiz Compend No. 13.) Illustrated. 12mo, pp. 109. Philadelphia: P. Blakiston, Son & Co., 1890. Price, cloth, $1.00; interleaved for taking notes, $1.25.

Of this Compend it may be said that the author has probably condensed into one hundred and six pages of text about as much information as could be expected in that space. Thirty-eight pages are devoted to the development, structure, and anatomy of the teeth, dental pathology and therapeutics, diseases of the dental pulp and membrane, diseases of the hard dental structure, injuries and diseases of the maxillary bones, defects of the palatine organs, extraction of teeth, and calcareous deposits,—an average of less than four pages to each of these topics. The remainder of the book is devoted to dental medicine.

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OBITUARY.

DR. WILLIAM A. BRONSON.

DIED, in New York City, August 20, 1890, of uræmia, WILLIAM AUGUSTUS BRONSON, M.D., in the seventy-fourth year of his age.

The death of Dr. Bronson removes a prominent man from the dental profession of New York, where he had been in practice for over forty years. He was born in Connecticut, June 4, 1817; was educated at Yale College, and received the degree of M.D. at that university in 1843. He practiced medicine in Connecticut for a short time, but soon removed to Newburg, N. Y., where he studied dentistry. In 1845 he went to New York City, where he soon built up a good dental practice. He was prominent in the operative and surgical branches of the profession. Dr. Bronson was one of the founders of the New York Odontological Society, in which organization he held many offices, and was for some time its president. He read papers before that society, and was to some extent a contributor to dental literature. In 1844 he married Miss S. D. Raymond, of New Haven, who died some eighteen years ago. They had two children, who died young. Dr. Bronson secured and retained the confidence and esteem of the profession by his kindly spirit and genial manner, and by a conscientious regard for the rights and feelings of all with whom he was associated. The remains were taken to New Haven for interment.

DR. JOHN STEPHAN.

Died, at Cleveland, Ohio, June 25, 1890, after a lingering illness, of consumption, John Stephan, D.D.S., in the forty-second year of his age.

Dr. Stephan was born at Essenheim, Germany, but at a very early age came to America with his parents, who settled at Cleveland. He was for a short time an apprentice at the machinist trade, for which he had some liking, but soon relinquished it and took up the study of dentistry, under the pupilage of Dr. H. N. Newton. He then attended the first course at the Ohio College of Dental Surgery, but commenced practice before graduation, and in a few years accumulated the means to complete his studies at that institution, from which he received the degree of D.D.S.

Dr. Stephan was a diligent worker in his chosen field of dentistry. He was a member of the Northern Ohio Dental Association and of the Cleveland Dental Society, and was the retiring president of the former at its last meeting. He leaves a widow and five children, two of his sons being dental students.

DR. CHARLES BONSALL.

Died, in Wyoming, Ohio, July 8, 1890, Charles Bonsall, D.D.S., of Cincinnati, Ohio, in the eighty-eighth year of his age.

So long ago as in 1847 Dr. Bonsall was a prominent dental practitioner in Cincinnati, where many years later he relinquished the practice and successfully engaged in the business of fire insurance. He was the first treasurer of the Mississippi Valley Association of Dental Surgeons, treasurer of the Ohio Dental College Association, secretary of the American Dental Convention, and active in nearly all the associative endeavors to establish the early educational foundations of dentistry. He was in every respect a good dentist, a good citizen, and a good man.

DR. H. A. BEAMER.

Died, at Colville, Ky., July 25, 1890, of heart-failure, Dr. H. A. Beamer, in the sixtieth year of his age.

Dr. Beamer was well known in dentistry in Kentucky. He practiced in Cynthiana for many years, and about two years since removed to Colville. He was a member of the Mississippi Valley Association of Dental Surgeons, and took a great interest in its proceedings and in all that concerned the progress of his profession.

PERISCOPE.

Anesthesia.—The most brilliant modern achievements in the direct saving of life by the science and art of medicine are connected with surgery. These great achievements have been rendered possible by two epoch-making discoveries, antisepsis and anesthesia. The long array of fatal cases of poisoning by carbolic acid, by iodoform, by corrosive sublimate, and by other antiseptic agents ; the hundreds of deaths from chloroform, ether, and other anesthetics,—all bear witness to the verity of the law of sacrifice, in obedience to which the progress of the human race is so often at the expense of the individual. Antisepsis has outgrown the dangers of its youth, and to-day the measures that are meant to save, very rarely kill. On the other hand, the death-roll of anesthesia is daily added to ; added to, according to my belief, at a rate that has not changed in forty years. Though this be true, from far-off Australia comes the news that jury and judge have condemned to heavy penalty a chloroformist who had lost his patient ; and in England itself a leading medical journal lends support to such a verdict by affirming that "deaths from chloroform are preventable, that with due care they may be avoided," and that, therefore, when they occur, they are the result of ignorance or carelessness. If this be true, five hundred deaths and more—the result of ignorance or carelessness! Five hundred surgeons, including such names as Billroth, Jaeger, Simpson, McLeod, Agnew, Hunter McGuire, and others of equal rank, guilty of manslaughter! And still death goes on. Surely, under such circumstances, the subject of anesthesia is worthy of the attention of even this, the most learned medical gathering of the nations that the world can furnish. Antisepsis, the gift of the Old World to humanity : anesthesia, the gift of the New World, which made the fruits of antisepsis possible : surely it is fitting that I, standing here to-day as the representative of the newer civilization, should be the chosen mouthpiece for the renewed discussion of this old but pressing theme.

In attempting a fresh study of a well-threshed-out subject, I propose to take advantage of the modern physiological methods, and to endeavor to discover by experiments upon the lower animals how anesthetics kill, and what drugs or measures are most powerful in putting aside their lethal effects. This brings us face to face with the question, How far is it possible to adapt experiments to the needs of practical medicine, and to reason from the lower animal to the man? A full discussion of this subject would not be opportune, but it does seem necessary for our purposes to devote a few minutes to the pointing out of certain guiding principles.

It ought to be acknowledged as a fundamental axiom, that no amount of experiments can overthrow a clinical fact ; although when a contradiction between experimental and bedside observation seems to arise, such contradiction challenges the correctness of the alleged clinical and experimental facts alike, and should lead to a careful re-examination. No amount of failure to purge a dog by elaterium proves that elaterium does not purge man ; whilst, on the other hand, the discovery that digitalis increased the blood-pressure in the lower animals very properly led to doubt as to the correctness of the, at the time, general belief that digitalis acts upon man as a cardiac sedative, and finally to the recognition of the falsity of the clinical observation upon which such belief rested.

Whatever difficulties may beset the path of the experimental therapeutist, it is certain that law is throughout the universe supreme ; that man, at least in his physical nature, is only an especially developed animal ; and if drugs act differently upon different animals, such action must be in obedience to certain laws, to us known or unknown.

Any attempt to fairly discuss these laws would lead us too far afield for the present. One law, however, treads so closely upon the matter at hand this morning, that it requires statement. This law is, that when an apparatus or system is of similar function, and of similar functional activity in different animals, the difference in the action of remedies is very rarely, if ever, in kind, though it may be in degree. Throughout mammalia the heart has one general structure, and one general function ; the heart of the dog responds to the touch of digitalis as does the heart of the man. The human brain is so much more highly developed than the brain of the lower mammal that it is, in fact, a new organ or apparatus, and its relation to drugs changes with the change of structure and of function. The scope of this law in regard to anesthesia is not far to seek. The functions especially compromitted in lethal anesthesia are respiration and circulation. Surely these functions are similar throughout mammalia, and surely we ought to be able to safely reason concerning them, from the lower animal to the man.

Recently, however, alleged clinical facts have been challenged by high authority, upon the strength of experimental results. Under these circumstances, nothing must be at once abandoned, everything must be re-examined. These re-examinations I have made, and I may be pardoned, perhaps, if I affirm that a complete study of the clinical and experimental evidence brings out, not a discord, but a most beautiful concord,—that concord between experimental and practical medicine which so often fails to appear, simply because we cannot fit together the fragments of truth in our possession.

Although numerous substances have been tried, there are to-day in use, practically, only three anesthetics,—nitrous oxide, ether, and chloroform. Of these, nitrous oxide stands apart, because it produces loss of consciousness not by virtue of any inherent properties, but simply by shutting off from the nerve-centers the supply of oxygen.

It has been asserted that the changes of circulation produced by the inhalation of nitrous oxide are essentially different from those of mechanical asphyxia, and that therefore nitrous oxide does not act as an asphyxiant. It must, however, be borne in mind that the phenomena of mechanical asphyxia are largely due to the presence of an excess of carbonic acid in the blood, whilst in the asphyxia produced by nitrous oxide there is no excess of carbonic acid in the blood, so that the phenomena present are simply the outcome of a lack of oxygen. It is, therefore, *a priori*, to be expected that the phenomena of mechanical and of nitrous-oxide asphyxia should differ to a certain extent. To determine the way in which nitrous oxide inhalation affects the circulation, I have, during the past winter, in connection with my assistant and friend, Dr. David Cerna, made a long series of experiments. The result has been to show that usually the inhalation is followed by a rise of the arterial pressure, accompanied by a great disturbance of the pulse ; the pulse at first becoming irregular and tumultuous, but by and by settling, so that when anesthesia is complete the pulse-wave is remarkably large and full, and the rate very slow. The rise and fall of the arterial pressure in nitrous oxide anesthesia was found to vary remarkably, not only in different inhalations, but in different periods of the same inhalation. Sometimes the rise was sudden, sometimes it was slow and gradual ; sometimes it was maintained until near death, sometimes it was interrupted very early ; sometimes it was not very well marked, sometimes it was enormous.

In all our experiments respiration ceased while the heart was still in full activity. Indeed, instead of the gas acting as a cardiac depressant it appeared to act as a cardiac stimulant, although it paralyzed the vaso-motor apparatus. Thus, during complete anesthesia, faradic irritation of the sciatic nerve always failed to register itself in an increase of the blood-pressure, although the heart was beating very powerfully, and although the pneumogastrics had been previously severed ; whilst late in the poisoning—at a time when the respiration had absolutely ceased, and the animal was in this respect dead, and without the power of self-recovery, and when the arterial pressure also had fallen almost to zero—the pulse-waves were frequently still nearly three times the norm.

We made but few experiments as to the action of artificial respiration upon the animal dying from nitrous oxide, but these experiments proved that even after complete paralysis of the respiratory function artificial respiration is capable of rapidly bringing the animal back to life. The heart lives on through nitrous-oxide anesthesia long after the respiratory function has been abolished ; and even when the strong, full pulse fails, and the heart has almost ceased to quiver, recovery is still hopeful, because the loss of function has been caused, not by the presence of a poison, but by the absence of oxygen ; and although the paralysis may be complete, the life-power sleeps before it dies, and is ready to awake at the call of fresh oxygen.

These experimental results are in strict accord with clinical observations. The S. S. White Dental Manufacturing Company supply a very large, if not the largest, portion of the apparatus and material used for the administration of nitrous oxide in the United States ; and in answer to my inquiry, Dr. J. W. White, their president, writes me that a computation based upon their own sales and a knowledge of those of their rivals has reached "the somewhat appalling result, that anesthesia by nitrous oxide gas is probably effected in three-quarters of a million of cases annually in the United States." Most of these inhalations have been given, not by trained physicians, but by comparatively untrained, and sometimes even ignorant, dentists ; have been given to patients in a sitting or semi-sitting posture ; have been given apparently, to the general community, as the units presented themselves, to the healthy and to the diseased alike ; and the result is, out of many millions of inhalations, only three deaths recorded as directly due to nitrous oxide ! Could anything be safer ?

A suggestive and very practical fact which came out in our experiments, is that sometimes during an inhalation of nitrous oxide the rise of the arterial pressure is extraordinary and abrupt. Not long since, in the city of Philadelphia, a gentleman arose from the dentist's chair after an inhalation of nitrous oxide, staggered, and fell in an apoplexy. Is it not easy to perceive that when the arterial system is diseased, the great strain of a sudden rise of blood-pressure may produce rupture?

Some years since, Dr. Kenderdine, a Philadelphia surgeon of local note, died of diabetes, which he insisted was produced in him by the inhalation of nitrous oxide. This is in accord with the researches of the French physician, Dr. Lafont, who reported a case in which sugar appeared in the urine twice in a patient after the inhalation of the gas; and who also caused in himself and in dogs temporary glycosuria by such inhalations. Further, Dr. Lafont noticed, in a case of mitral insufficiency, temporary albuminuria.

I am not aware that these very suggestive statements of the French physician have given rise to any research, except five experiments made recently upon healthy men, with negative results, by two medical students of the University of Pennsylvania, Messrs. George S. Woodward and Alfred Hand, Jr. I do not believe that ordinarily the inhalation of nitrous oxide is followed by sufficient disturbance of the circulation to register itself in the urine, but the negative evidence of Messrs. Woodward and Hand is not sufficient to render it improbable that in exceptional cases the inhalation of nitrous oxide may produce albuminuria or glycosuria. Such phenomena, if they occur, are in all probability not directly produced by the nitrous oxide, but are due to the disturbances of capillary circulation caused by it.

However these facts may be, it seems to me that great caution should be used in the administration of nitrous oxide to persons the coating of whose arteries is diseased, and it is probable that when wide-spread atheroma exists ether is safer than nitrous oxide, on account of the possible after-effects of the latter anesthetic.

When respiration has been suspended in nitrous-oxide anesthesia, the overwhelming indication is certainly for artificial respiration.

Notwithstanding the great safety and the many advantages which attend the anesthetic employment of nitrous oxide, the gas can never be used for the general purposes of the surgeon, on account of the excessive fugaciousness of its influence.

The perfect anesthetic will be a substance which has the power of paralyzing the sensory nerve-trunks without affecting other functions of the body. If such drug exists, it yet awaits the coming of its discoverer. Probably until such a sensory nerve paralyzant is found, chloroform and ether will maintain the complete supremacy which they now have; and in the further discussion of my subject I shall confine my remarks to them. Lack of time limits this discussion to—

(1) The method in which these two drugs kill, both in man and in the lower animals; that is, whether they destroy life through the circulation or the respiration.

(2) The comparative fatality attending the use of these two agents, and the reasons for the difference.

(3) The comparative disadvantages between the two agents, and the best method of securing the desired results.

(4) The treatment of accidents occurring during ether- or chloroform-anesthesia.

In regard to the method in which anesthetics kill, my own teaching hitherto has been : (1) that although ether in moderate doses acts as a stimulant to the circulation, yet in overwhelming amount it is capable of depressing the heart, but that such depression of the heart is always less than the depression of the respiration ; (2) that chloroform may produce death by paralysis of the respiratory center, or by a simultaneous arrest of respiration and circulation, but that primary paralysis of the heart may occur, and is especially prone to do so when the chloroform vapor has been given in concentrated form.

I think that these views are in accord with general professional belief, but it has recently been alleged that they are at variance with experimental evidence, so that a re-examination is necessary. What, then, are the clinical facts?

If any credence is to be attached to the statements of competent witnesses who have recorded human deaths during anesthesia, it is certain that in some cases, under the influence of chloroform, the pulse and respiration have ceased simultaneously, whilst in other instances the respiration has failed before the pulse ; and in still other cases the pulse has ceased its beat before the respiratory movements were arrested.

Usually ether arrests respiration in man before it paralyzes the heart, but the collection of records made by Dr. J. C. Reeve certainly shows that the fatal result may be produced by syncope. Thus, Dr. Ernest H. Jacobs, in a report of a fatal case, asserts positively "the pulse ceased, the breathing continued." It would seem that we must allow that ether in the human subject may cause death in the same methods as does chloroform.

Such, then, are the clinical facts ; or in other words, such are the results of observations made upon the human subject. What are the results of observations made upon animals?

The general teaching in regard to chloroform has been recently challenged by Dr. Lauder Brunton, who, as the result of four hundred and fifty experiments made by himself upon the pariah dogs of India, has reached the conclusion, as published in the London *Lancet*, that however concentrated the chloroform may be, it never causes death from sudden stoppage of the heart. In the physiological laboratories of the University of Pennsylvania, for some years, several hundred dogs have been used annually, and a very large proportion of these dogs have been, at the end of an experiment, killed by chloroform. The observations of Dr. Reichert, professor of physiology in the University ; Dr. Hobart Hare, demonstrator of therapeutics, and myself, have been concordant in showing that chloroform is a cardiac paralyzant, and often does kill dogs by a direct action upon the heart or its contained ganglia. The statements made concerning the Hyderabad Commission, however, led Dr. Hare and myself to a thorough and careful restudy of the subject. Some of our experiments were made by injecting chloroform into the jugular vein ; others by administering it by inhalation in the usual way.

The action of the chloroform seems to be not seriously modified by the method of administration. We definitely proved that in the American dog chloroform has a distinct, direct, paralyzing influence on both respiration and circulation ; that the respiration may cease before the heart-beat, or the two functions be simultaneously abolished ; but that in some cases the heart is arrested before respiration. We have frequently seen the respiration continue as long as one, and in some instances even two minutes after the blood-pressure had fallen to zero and the pulse had completely disappeared from the carotid artery.

I do not desire to express any doubt whatever as to the correctness of the experimental data of Dr. Brunton ; I simply claim that both sets of experiments, although they have yielded different results, have been correctly and properly performed. It may be that the high heat or other climatic conditions surrounding the pariah dog make his heart less sensitive to the action of chloroform than is the heart of the dog bred in northern climates. That the thought of the different constitutions of animals in different climates is not absurd, is shown by the fact that some years ago—after I had affirmed before the Physiological Section of the International Medical Congress at London, that if certain asserted results were obtained upon European dogs said dogs must differ from those of America, and had been met with a smile of incredulity—Dr. Brown-Séquard rose and stated that he had experimented upon hundreds of dogs on both continents, and that there was a distinct difference between the animals, the vascular system of the European dogs being much more developed, and operations upon them being, therefore, much more bloody than is the case with the American dog.

A very curious parallel might be traced at this point between the experimental and clinical evidence in regard to the effect of climate upon the action of chloroform ; in the southern United States chloroform is used with great freedom, and with great alleged safety ; and as long ago as 1878, Dr. Langdon B. Edwards, editor of the *Virginia Medical Monthly*, wrote, "It is one of the most peculiar facts I have ever known in medical practice, the difference of experience in Europe and the North, with chloroform and ether, as compared with that of the South, the high rate of mortality in the North, and the low rate of the South." Further, in a recent letter to me, Sir Joseph Fayrer is very emphatic as to the safety of chloroform in India.

In a series of experiments which I have recently made myself to determine the changes in the circulation produced when ether-anesthesia is carried on to death, I have found that in the first periods of anesthesia the blood-pressure is usually elevated, and that it is usually quite high at a time when the respirations are very shallow and imperfect, and the dark color of the blood shows that it is heavily charged with carbonic acid. It is not, however, very rare for the blood-pressure to remain near the norm, and I have seen the blood-pressure begin to fall in the very first stages of ether-anesthesia ; moreover, in at least two experiments death occurred from syncope, the respiration continuing for one or two minutes after the complete cessation of the circulation. In an experiment in which the fall of blood-pressure was most pronounced, and the arrest of the heart most complete, the dog was sick from the mange, and it is possible that the weakened heart was more susceptible than the normal heart to the depressing influence of ether.

So far, then, as concerns the method in which ether or chloroform kill, I claim most urgently that there is no contradiction between the results as obtained by the bedside and in the physiological laboratories, and that a complete, broad study of the clinical and experimental evidence leads to one conclusion : namely, that chloroform and ether are capable of paralyzing the respiration and the circulation; that in some cases one function, in other cases the other function, is primarily arrested; but that ether is less prone to produce a primary arrest of the heart than is chloroform.

In the discussion of the second point which I have raised, namely, as to the comparative fatality attending the use of ether and chloroform, I shall not occupy time with any elaborate setting forth of the clinical evidence. In regard to the number of recorded deaths I shall content myself with accepting the latest statistics at hand, namely, those collected by Dr. Laurence Turnbull, who has found three hundred and seventy-five deaths reported from chloroform, and fifty-two from ether. I do not believe that these figures nearly represent the total mortality. I doubt very much whether one-third of the deaths from anesthesia are reported; certainly not one-third of the cases I have had personal knowledge of have been publicly recorded. Moreover, the pressure to conceal deaths from chloroform is greater than when the lethal result is due to ether. The surgeon who uses ether feels that he has employed the safest anesthetic, and that he will receive no blame if a death occurs from it, and feels also that he has a rare case to put on record, which will give his own name a permanent place in anesthetic literature; whereas the surgeon who uses chloroform knows that if death occurs from the anesthetic a large proportion of the profession, at least in the United States, will condemn him either in public or secret for the use of this drug, and that he will be fortunate if he escapes being publicly condemned by a coroner's jury. Moreover, deaths from chloroform are only too common, so that the surgeon has nothing to gain and much to lose by publication of a chloroform death, and, if possessed of the average human nature, holds his peace.

It seems to me impossible to get at the exact number of anesthetic deaths, or the proportionate fatality of ether and chloroform. Lyman considers that in regard to chloroform the ratio of deaths to inhalations is 1 in 5860; Richardson, that it is 1 in 2500 to 3000. Andrews puts it, for ether, at 1 in 23,204, and Lyman at 1 in 16,542.

Without claiming strict accuracy for any of these figures, I think that it can be asserted that the probable ratio of deaths from chloroform is four to five times that of deaths from ether.

When we come to study the effects of chloroform upon the lower animals, we find that it varies very distinctly in its action on the different species. The cat seems to withstand the fatal influences of chloroform with a power worthy of its reputed "nine lives." Many years ago, Professor Schiff called attention to the fact that the use of chloroform as an anesthetic in dogs is usually attended with the loss of many animals. Professor Martin, of the Johns Hopkins University, writes me that the margin between complete chloroform-anesthesia in the dog and chloroform-death is a very narrow one. This certainly is our experience in the University of Pennsylvania; we have never been able to use chloroform as an anesthetic without losing a very large proportion of our dogs.

Clinical and experimental results—*i.e.*, the results of experiments made in the physiological laboratory upon the lower animal, and the results of experiments made in the amphitheater upon the higher animal, man—are again concordant. Chloroform is much more inimical than ether to animal life. The cause of this singular fatality is not, however, chiefly the cardiac action of chloroform. Chloroform is more apt to cause cardiac arrest than is ether, but it is also much more prone than is ether to cause death by failure of the respiration. Almost invariably, when ether is withdrawn before the dog is absolutely in the grasp of death, recovery occurs ; but over and over again I have noticed that although the chloroform was taken away whilst the respirations were still being maintained with regularity, the arterial pressure much above zero, and the pulse very apparent, yet the symptoms of cardiac and respiratory failure continued to increase until the fatal issue was reached.

It seems to me that certain general facts or principles in regard to anesthesia must be considered as established :

(1) That the use of any anesthetic is attended with an appreciable risk, and that no care will prevent an occasional loss of life.

(2) That chloroform acts much more promptly and much more powerfully than ether, both upon the respiratory centers and the heart.

(3) That the action of chloroform is much more persistent and permanent than is that of ether.

(4) That chloroform is capable of causing death either by primarily arresting the respiration, or by primarily stopping the heart, but that commonly both respiration and cardiac functions are abolished at or about the same time.

(5) That ether usually acts very much more powerfully upon the respiration than upon the circulation, but that occasionally, and especially when the heart is feeble, ether is capable of acting as a cardiac paralyzant, and may produce death by cardiac arrest at a time when the respirations are fully maintained.

(6) Chloroform kills, as near as can be made out, proportionately four or five times as frequently as does ether ; partly, no doubt, because it is more powerful in depressing the heart, but largely because it lets go its hold much less rapidly than does ether when inhalation ceases. Is it not possible that this ''holding on'' is because it is less volatile than ether, and can we not here get a hint why chloroform is less deadly in the South than in the North ? The diffusibility of vapors or gases is in inverse proportion to the square of their densities, and the vapor of chloroform would certainly diffuse itself with far greater rapidity at 90° F. than at 70° F.

The comparative advantages and disadvantages of the two anesthetics in practical medicine are so well known, that only one or two points seem to force themselves upon our present attention. I cannot see that the surgeon is justified in putting the life of the patient to the unnecessary risks of chloroformization, except under special circumstances. I believe, moreover, that much of the unpopularity of ether is due to its improper administration. It is so easy to embarrass the respiration seriously by the folded towel, as commonly used, that not only are the struggles of mechanical asphyxia almost invariably produced, but probably death itself sometimes caused. Especially is there danger of death being thus caused mechanically in the advanced stages of etherization, when the patient is too thoroughly etherized to struggle, and when the attention of the etherizer is, it may be, attracted by some novel and difficult operation. I confess myself to once having nearly killed a patient in this way.

A proper apparatus is certainly preferable to the folded towel. Various have been invented, but as the time is short I shall only mention one,—one which seems to me a practically perfect mechanism, although it is probably little known this side of the Atlantic.

The inhaler invented by Dr. O. H. Allis is based upon the theory that the patient to be etherized should be supplied with a full abundance of air, saturated with the vapor of ether. It consists essentially of a series of foldings of muslin on a wire framework, arranged almost like the gills of a fish, so as to allow the air to pass freely through, but everywhere come in contact with ether. It should be placed upon the face of the patient dry, and the ether gradually poured on from a bottle with a tight cork through which run two small bent glass tubes, —one inside of the bottle, long, for the exit of the ether, the other short, for the admission of air. When properly used, the Allis inhaler practically does away with the sense of suffocation, and the consequent struggles which have made etherization so repulsive to patient and surgeon alike.

In order to determine the rapidity with which etherization can be produced by this inhaler, Dr. M. H. Williams kept for me notes of thirteen consecutive cases in the clinic of the Jefferson Medical College Hospital, in Philadelphia. The average time required for the production of complete unconsciousness was eight minutes. The average time during which anesthesia was fully maintained was thirty-two minutes, and the average amount of ether used during this time was seven and one-half ounces. In twenty-one surgical cases occurring this spring in the clinical service of Prof. J. William White, of the University of Pennsylvania, the average time for the production of complete anesthesia with ether, used through Allis's inhaler, was seven and nine-tenths minutes. The results arrived at in these two clinics are so close that eight minutes must be considered as the average time required for full etherization by this apparatus.

In discussing the treatment of the accidents of anesthesia, the results obtained at the bedside naturally press forward for careful consideration, but in going over the subject from this point of view I have found so little that was novel, and so little that was satisfactory to myself, that I shall not occupy the time of this Congress with any conclusions drawn from reported cases, or personal experience in chloroform accidents. I do not think myself that the problem can be solved by any such study of cases. Death is so near and so terrible, time is so absolute, moments so important, that no surgeon would be willing or justified in waiting for the effect of any one remedy; and when a man is dosed with alcohol, nitrite of amyl, hypodermic injections of ether, digitalis, atropine, and other powerful agents; faradized, slapped, douched, stood on his head, subjected to chest-movements for artificial respiration, and various other measures too numerous to mention, who can tell, if by chance he recover, why he has done so? or who can point out, if by chance he die, what is the remedy whose omission or commission has led to the fatal result?

The problem is a very complex one, not to be worked out amidst the excitement and responsibilities of the amphitheater. Only in the physiological laboratory can its various elements be separated and studied each by itself, without regard to the individual life which is at stake.

In the physiological laboratory two distinct paths open, each promising to lead to some positive knowledge. We may, on one hand, enter upon the study of the minimum fatal dose of the anesthetic, and of the results produced by the consentaneous or subsequent administration of its supposed physiological antagonist, or we may investigate the effect of remedies upon functions that are failing under the influence of the anesthetic.

The objections to the first of these methods have been, in the present instance, overwhelming. The accidents seem to be independent of the amount of anesthetic inhaled, and such a method of investigation would have required far more time than was available after I had had the honor of being asked to address this body. Death is produced by chloroform and ether through paralysis of the respiration and the heart, and the method of experimental study which I have employed consisted in a study of the action of medicinal agents upon these functions when oppressed by chloroform. I have selected chloroform chiefly because it is the more powerful agent of the two anesthetics, and the more certain in its lethal results.

The experiments have all been made upon dogs, by one plan. The carotid artery, and also the trachea, having been connected with a recording drum, so that the movements of the circulation and the respiration could be consecutively recorded, the animal was anesthetized, and when the blood-pressure had fallen almost to zero, and the respiration had ceased, or nearly ceased, as the case might be, a solution of the remedy to be tried was injected into the jugular vein, through a canula which had been previously inserted.

The more important remedies which have been used by clinicians for the averting of threatened death during anesthesia are ether, alcohol, ammonia, nitrite of amyl, digitalis, atropine, and caffeine, alterations of position, and artificial respiration.

Although, at least in America, hypodermic injections of ether have been frequently employed even in ether-accidents, such use is so absolutely absurd that it does not seem to me to require any experimental evidence of its futility. Ether in the blood acts as ether, whether it finds entrance through the lungs, through the rectum, or through the cellular tissue ; and the man who would inject ether hypodermically to a patient who is dying from ether should, to be logical, also saturate a sponge with the ether and crowd it upon his unfortunate victim.

Instead of simply stating the results obtained in my experiments, I have thought it would be more interesting to show reproductions from some of my tracings. The first drug that I shall report upon is caffeine. I have injected it during the cardiac failure produced by chloroform, in doses varying from three to seven and one-half grains, and have never been able to perceive any distinct alteration in the arterial pressure, and no consistent distinct change of the pulse either in number or force. So far as the experiments go, they certainly indicate that the drug has no influence upon the heart that is being overpowered by chloroform. I may also state here that it is not possible in any of my tracings to make out any influence exerted by caffeine upon the respiration.

With atropine I have made a few experiments, the results being almost as negative as with caffeine. Ten c.c. of a two per cent.

solution of atropine injected into the jugular vein of a chloroformed animal altered the rate of the pulse-beat, but had no apparent effect or influence upon the arterial pressure, or upon the respiration, and in no wise prevented final cardiac arrest.

Of all drugs, that which I think is usually most relied upon by clinicians as a cardiac stimulant in anesthesia, as in other cases of heart-failure, is alcohol. The chemical and physiological relations of alcohol to ether and chloroform are, however, so close, that many years ago I became very doubtful of the value of this drug as a stimulant to a heart depressed by one of these anesthetics.

These doubts continually grew stronger from what I saw and read as to the effects of the administration of alcohol during anesthesia, and were finally changed into conviction by the experiments of R. Dubois (*Progrès Méd.*, 1883, xi, 951), who found that in the animal to which alcohol had been freely given, much less chloroform is required than in the normal animal, to anesthetize or to kill; or in other words, that alcohol intensifies the influence of chloroform and lessens the fatal dose.

In my own experiments with alcohol, an 80 per cent. fluid was used, largely diluted with water. The amount injected into the jugular vein varied in the different experiments from five to twenty c.c.; and in no case have I been able to detect any increase in the size of the pulse, or in the arterial pressure, produced by alcohol, when the heart was failing during advanced chloroform-anesthesia. On the other hand, on several occasions, the larger amounts of alcohol apparently greatly increased the rapidity of the fall of the arterial pressure, and aided materially in extinguishing the pulse.

The effects of ammonia upon the failing heart of chloroform-anesthesia have been in my experiments uncertain; sometimes distinct, although very fugacious, and sometimes imperceptible. Twenty cubic centimeters of a 10 per cent. solution of aqua ammoniæ fortior (U. S. Pharmacopœia) in some cases produced an immediate rise in the arterial pressure, and even fugaciously registered itself in the respiratory rate, but perhaps more frequently it failed in its influence.

The influence of injections of digitalis has been, in a number of experiments, very pronounced in producing a persistent gradual rise of the arterial pressure with an increase in the size of the individual pulse-rate. In several instances death was apparently averted by its injection, and I saw in one or two cases, where large amounts of the digitalis had been employed, sudden systolic cardiac arrest, indicating that digitalis, if in sufficient amount, is able to victoriously assert itself in opposition to chloroform. Moreover, when I have given chloroform to dogs whose hearts were already under the influence of digitalis, there has seemed to be a peculiar steadying or sustaining power combating the circulatory depression naturally produced by the anesthetic, and I believe that in all cases of weak heart in man a full dose of digitalis before the administration of chloroform would greatly lessen the danger of cardiac collapse.

With the nitrite of amyl four experiments were made. In some of these from four to ten drops of the nitrite of amyl were injected in the jugular vein, in others the nitrite was used by inhalation. No distinct effect upon the arterial pressure was in any instance produced, and usually no alteration in the size of the pulse-waves, although sometimes the pulse did appear to be a little fuller.

Of all my experimental results, those which have been reached with strychnine have been the most surprising. The injection of strychnine into the jugular vein sometimes produced a gradual rise of the arterial pressure, but always caused an extraordinary and rapid increase in the rate and extent of the respiration. Thus I have seen the respiration, which had ceased for ten seconds, suddenly, under the influence of an injection of two-tenths of a grain of strychnine, become at once very large and full, and reach a rate of 130 a minute.

A series of elaborate experiments made upon the effect of the position of the animal on the blood-pressure in the carotid and other arteries, has very clearly proven that the body of the animal whose circulation has been paralyzed by chloroform acts in a measure like a tube filled with fluid. Thus, if the feet of the dog were raised vertically above the head whilst the latter remained upon the table, an immediate rise of pressure occurred, even though the heart had ceased beating entirely, provided that the head of the animal was kept upon a level with the table. If, however, the head of the animal were depressed below the level of the table for a distance equal to or greater than the length of the body of the animal, a decrease of the arterial pressure occurred at once, although the animal was in a vertical position. The phenomena observed were precisely such as would have been produced if the canula had been inserted into a tube filled with fluid, instead of into the carotid artery, and the elevation and depression of this tube had registered itself on the recording drum, in obedience to the ordinary laws of hydrostatics. The phenomena were entirely independent of any beat of the heart, and were readily produced when the animal was dead, provided the death had not occurred too long previously. Sometimes, even a very few minutes after the cessation of the heart-beat, it was impossible to produce the changes of pressure upon the drum. This I believe to have been due to coagulation of the blood, occurring very early after death to a sufficient extent to interfere with the liquid properties of the fluid. In no case was any effect upon the respiration produced by the change of position. In a number of cases, however, when the feet were elevated, the heart, which had entirely ceased beating, recommenced its work, and I have several times seen a pulse entirely disappear when the animal was taken from the vertical to the horizontal position. On the other hand, very frequently it was impossible to affect the cardiac action by changing the position of the animal. Nevertheless, the phenomena spoken of occurred too frequently to be a mere outcome of chance, though I several times noted that the heart was usually more affected by alternately elevating and depressing the feet of the animal than by keeping it in a steadily elevated or horizontal position.

When the circulation has practically ceased, under the depressing influence of an anesthetic, inverting the body must cause the blood which has naturally collected in the excessively relaxed vessels of the abdomen to flow into the right side of the heart and distend it, and this distention—this increase of pressure—appears at times to have a sufficient momentary influence to stimulate the failing organ.

The theory which has been advocated by some therapeutists that inversion of the body is of value in the accidents of anesthesia, because it causes the vital centers of the brain to be supplied with blood, is probably incorrect. The respiration in anesthesia fails, not through want of blood in the respiratory centers, but because the blood contains a poison which paralyzes these centers.

The most remarkable results which I have reached in bringing about recovery of animals to all ordinary intents and purposes dead, were obtained through the use of artificial respiration. Thus, I have seen an animal, in which no respiratory movements whatever had taken place for two minutes, and in which, during that time, no movements of blood had occurred in the carotid artery, and in which, therefore, the heart had ceased its beat, rapidly and permanently restored by artificial respiration.

At one time in these researches, it appeared as though after any dose of chloroform by inhalation the animal could be resuscitated by artificial respiration, even though heart and lungs were completely paralyzed by the drug ; but finally I did find a case in which, after the animal had repeatedly been apparently killed and resuscitated, artificial respiration failed.

The results of my experiments with the lower animals may be summed up : that nitrite of amyl, caffeine, and atropine are of little or no use in chloroform-poisoning ; that alcohol, when given in small amounts, has no influence, but that when given largely, materially assists in paralyzing the heart and producing fatal results ; that ammonia has some little influence upon the heart ; but that of all substances tried, digitalis is by far the most powerful in stimulating the failing circulation ; indeed, my experimental results indicate that it is the only known drug which is of any real practical value in such cases. Next, or perhaps even before digitalis, strychnine seems to be of value in the accidents of anesthesia, because, whilst having some influence on the circulation, it affects powerfully the respiration. For many years chloroform has been used in practical medicine as the physiological and practical antagonist to strychnine, and it seems rather odd that strychnine should not have been employed as the practical antagonist to chloroform.

The one measure which in practical value far surpassed all others for the restoration of the dying animal was artificial respiration, and I have no doubt that a great majority of the deaths which have occurred in man from anesthesia might have been avoided by the use of an active artificial respiration. The difficulty with artificial respiration as it has been hitherto practiced upon man, after the Silvester or other methods, is its inefficiency ; whereas the artificial respiration which I used on animals was very active,—indeed, much more efficient than natural breathing in causing circulation of air through the lungs, and therefore in removing excess of the anesthetic from the residual air in the lungs and from the blood.

The use of what may be called "forced" artificial respiration by the physiologist so naturally suggested a similar practice in man, that the celebrated John Hunter invented for the purpose an apparatus which consisted of a bellows so constructed that when it was extended one compartment drew in air from the lungs, whilst the other drew air from the atmosphere ; and when it was closed the process was reversed, the fresh air being thrown into the lungs, the foul air into the atmosphere. In 1867, Richardson, of London, invented an apparatus more elegant and portable, although identical in principle with that of John Hunter ; but I have not found that either Hunter or

Richardson treated by forced artificial respiration an actual case of disease or poisoning. In 1875 (*Boston Med. Journ.*, vol. xxi), Dr. John Ellis Blake reported a successful case of aconite-poisoning, in which life was apparently saved, although there was no pulse for over three hours, by artificial respiration with the use of oxygen. In this case Marshall Hall's method was at first used, but later a small rubber tube was connected directly with a copper reservoir of condensed oxygen, the other end of the tube terminating in a small nozzle, which was inserted in one nostril. Four hundred gallons of oxygen were thus used, but how far the force of the compressed gas was employed to dilate the lungs is not very clear; and it is somewhat doubtful whether this case should be considered as one of forced respiration. The first physician to use forced respiration in actual human poisoning, with a clear idea of its value and power, so far as my reading goes, was Dr. George E. Fell (International Medical Congress, Washington, 1877).

It is plain that the bellows constructed by John Hunter and by Richardson are unnecessarily complex and faulty in principle. There is no need whatever of drawing the air out of the fully-filled lungs. Every physiologist knows that when the muscular system is completely paralyzed by woorari, or even by death, that the chest-walls have sufficient elasticity to force air out of the lungs, and all ordinary laboratory apparatus for artificial respiration is based upon this fact. For forced artificial respiration in man, an ordinary bellows of proper size is all that is required for the motive power.

The real difficulty—the point to be especially investigated and studied—is as to the connection between the bellows and the lungs. Hunter and Richardson simply placed a tube in one nostril, closing firmly the other nostril and the mouth of the subject.

Dr. Fell at first used a tracheal tube, the insertion of which of course necessitated the performance of tracheotomy. In one case, however, a simple mask covering the mouth and nostrils was a perfect success. I have had no opportunity of trying the apparatus on the living, but have made a series of experiments upon dead bodies, which have demonstrated that usually a face-mask is all that is necessary for the performance of artificial respiration. Before using the mask the tongue should be well drawn forward, and, if necessary, fixed in this position by an ordinary piece of suture silk run through it, which can be held in the hand of the operator. If in any individual case the mask fails, an intubation tube may be introduced into the larynx. I do not believe that it is ever necessary to perform a tracheotomy.

Dr. Fell's apparatus consists of a pair of foot-bellows by which air is forced into a receiving-chamber, which is connected with an apparatus for warming the air, and a valve which can be opened and shut by a movement of the finger. This valve in turn leads to the tracheal tube. When the valve is opened the air rushes through the chamber into the lungs and expands them; the finger is lifted, the valve shuts, the lungs contract, and so the respiration goes on. I have no doubt that this apparatus is efficient in practice, but it is open to the serious objection of being unnecessarily complex and costly.

A much simpler, cheaper, and probably equally efficient apparatus may consist simply of a pair of bellows of proper size, a few feet of India-rubber tubing, a face-mask, and two sizes of intubation tubes;

there should also be set in the tubing a double metal tube, with openings so placed that their size can be regulated by turning the outer tube (similar to that commonly found in the tracheal canula of the physiological laboratory), so that it is in the power of the operator to allow for the escape of any excess of air thrown by the bellows. I suppose this whole apparatus could be prepared at a very small cost, and it seems hardly necessary to point out its probable value in various narcotic poisonings, and in other accidents in which death is produced by a temporary paralysis of the respiratory centers. The proper use of it could be taught to persons without special medical skill, so that it not only ought to form a part of the surgeon's outfit, but might be of great service in life-saving stations, about gas-works, etc.

In conclusion, I may be allowed to state that if the results and deductions arrived at in this address are, as I believe, correct, the rules for the proper treatment of accidents during anesthesia can be summed up in a very few words:

Avoid the use of all drugs, except strychnine, digitalis, and ammonia.

Give the tincture of digitalis hypodermically.

Draw out the tongue and raise up the angle of the jaw, and see that the respiration is not mechanically impeded.

Invert the patient briefly and temporarily.

Use forced artificial respiration promptly, and in protracted cases employ external warmth and stimulation of the surface by the dry electric brush, etc.; and remember that some at least, and perhaps many of the deaths which have been set down as due to chloroform and ether, have been produced by the alcohol which has been given for the relief of the patient.—H. C. WOOD, M.D.; *Address before International Medical Congress at Berlin.*

HINTS AND QUERIES.

TO CONTROL OCCLUSION.—Replying to the query of "G. M. M.," in the August COSMOS, it is to be said that before putting in the trial-plate the patient should be instructed to close the mouth in two different ways: first, by protruding the lower jaw, and second, by closing the jaw as far back as possible; being careful in each instance to note the expression of the features and to especially observe the profile. Let the patient by repetition become familiar with these two movements of the jaw, supplementing them with closure of the back teeth as in the act of swallowing. Then place the trial-plate, direct a closure in the natural way, and proceed as usual.—E. L. H.

TO CONTROL OCCLUSION.—In answer to "G. M. M.," in the August COSMOS, I suggest that he seat the patient so that the head shall be thrown very far back, and obtain the bite while the head is in that position. It would be gratifying if his success by this new method should be reported.—C. FRANK BLIVEN, Worcester, Mass.

BING TEETH PINS.—I find that the adoption of my suggestion of large pins continued through the teeth from side to side adapts them for the construction of strong and beautiful bridges, the spans of which consist simply of two or more teeth soldered together by these pins, that thus constitute continuous trusses on which the teeth are supported between the piers.—L. C. BRYAN, Basle, Switzerland.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

DISEASES INCIDENT TO THE FIRST DENTITION.*

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THE term "dentition," as here employed, does not include the development of the teeth-germs, but refers simply to the natural processes (usually beginning between the fifth and eighth months and terminating between the twenty-fourth and thirtieth months) by which the teeth are liberated from their osseous and fibrous coverings and made subservient to speech and mastication. "Incident" in the title of this article is to be understood as indicating various local and systemic disturbances which, occurring simultaneously with the eruptive processes of dentition, are in some instances at least certainly dependent upon them.

The first dentition is a physiological and anatomical crisis of infancy,—a process which, under conditions in every respect favorable, may proceed with little or no disturbance to the child, without attracting the attention of even a watchful mother, though it is rare for a child to pass through the period of dentition without more or less manifestation of suffering, and frequently there are serious and alarming disturbances of its health.

Authorities are at variance with regard to the liability to, and the frequency and importance of, departures from physiological dental evolution. There are extremists who overestimate the average influence of teething as a disturbing element, and on the other hand there are those who underrate the difficulties which may attend it. It is not disputed, however, that it is during the teething period that the greatest number of deaths occur. The mortality of infancy is alarmingly great, and though it must be admitted that many infantile diseases are in no way related to dental evolution, yet it is reasonable to assume that it has a large share in the production or aggravation of the derangements of health so common and so serious at this time of life, and that vast numbers of children die because of lesions which, if not dependent on, are concomitant with, the process of dentition. The nervous perturbation occasioned by the eruption of the teeth increases the susceptibility and lessens the resistive power of the child. Thus, because of a disturbance of its equilibrium, it is not only more sensitive to the ordinary causes of derangement,—to the impression of cold or to the irritation from unsuitable food,—but it is also less capable of combating disease ; and a catarrhal attack, an indigestion, or an eruptive fever, coming at this time, acts upon a system less able than usual to resist injurious influences.

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The period during which the teeth and surrounding tissues are undergoing those changes which precede and accompany the eruption of the former being one of augmented nervo-vascular action, there is then a more than usual liability to disturbance of harmony, and consequently a predisposition to functional derangement. It is analogous in this respect to other so-called critical periods, such as utero-gestation or the establishment and cessation of the menstrual function, which, though purely physiological processes, are subject to deflections which not infrequently place them within the domain of pathology. At each of these periods, but especially during the eruption of the teeth, the brain and nervous system, the stomach and intestinal tract, the circulatory and respiratory systems, show an increased though varying liability to irritation.

Coincident with the development of the masticatory apparatus other important changes are taking place in the organization of the child, notably in the stomach and intestinal tract, preparing these for the reception and digestion of solid food. These concurrent changes, while exercising their full share in the production of constitutional disturbances at this period, increase also the nervous impressibility of the child, and thus lessen its ability to resist other perturbative influences. The natural vigor of the child, the state of its general health, and the conditions by which it is surrounded exert an influence in preventing or promoting aberrations in dental evolution. Improper clothing, atmospheric variations, intense or prolonged heat, cold or dampness, miasmata, the exanthemata, indigestion, excitement of the nervous system by fright or anger,—anything which, causing a modification in the normal standard of healthy life, reduces the resisting power of the organism, may find pronounced expression in a disturbance of the otherwise physiological process of dentition.

A consideration of pathological dentition recognizes interference with function in contiguous or remote organs from causes originating in the mouth, and, as well, the expression in the oral cavity of constitutional disturbance. Pathological dentition may thus be credited with causing or aggravating various systemic disorders, as such disorders may in turn be reasonably suspected of interference with this developmental process. Therefore, while dentition is not to be held accountable for all the ills to which infancy is heir, it is unsafe to ignore the possible pathological complications in any case. It does not militate against the theory that dentition is frequently a disturbing element because multitudes of children escape, in part or altogether, the evils with which others, having feebler powers of resistance, are afflicted. There are varying degrees of susceptibility, differences of environment, of hygienic care, of quality of food, of clothing, and of habits taught or allowed, that enter into the problem of the maintenance of infantile health, the influence of which can be only approximately estimated. Viewing dentition, therefore, either as the principal factor in the production of constitutional disturbance or as a single link in a chain of deranged activities, it is surely desirable that a careful investigation should be made as to the condition of the eruptive process in all cases of infantile disease.

An intelligent understanding of the subject under consideration requires an appreciation of the physiological relations of the mouth and of the peculiar sensitiveness of infancy. Anatomically considered, no other portion of the human organism offers such a complex association of tissues as those which compose the mouth ; no other has such diversified physiological functions, and, from a pathological stand-point, no such significant systemic relations. Its various offices necessitate a no less varied organization and an equally varied relation with other structures. The wide circle of its anatomical and physiological sympathies suggests an equal circle of pathological complications, and indicates the diversity, as well as the gravity, of the disturbances dependent upon systemic relations to which its lesions may give rise. By means of its lining mucous membrane the mouth is related by continuity with the pharynx, œsophagus, stomach, and intestinal tract, the larynx, trachea, and bronchi, and by contiguity, as well as by continuity, with the eyes, ears, nares, and antra. But it is to direct or sympathetic nervous relations that the most formidable disturbances resulting from an interference with the eruptive process are to be attributed. The terminal distribution in and about the mouth of the sensory and motor branches of the sensitive trigeminus, its extensive topographical connections and their relations to the heterogeneous tissues and manifold functions concerned, and its association with the great sympathetic, thus connecting the teeth with the entire organism, explain the liability to aberrations of sensation, nutrition, and motion when its termini are the seat of disordered sensibility. It should be remembered that the fifth nerve is the largest of the cranial nerves ; that it is the great sensitive nerve of the head and face, the nerve of the special sense of taste, the nutrient nerve of the teeth, and the motor nerve of the muscles of mastication ; that it not only gives off important branches,—the ophthalmic, the superior and the inferior maxillary,—but that these, by subdivisions, supply branches to the eye and eyelids, the nose, the ears, the forehead and scalp, the upper and lower lips, the chin, the gums, the tongue, and the teeth of the upper and lower jaws ; that filaments of the maxillary branches again join the ophthalmic branch and the seventh nerve, which controls the muscles of the face ; that its numerous ganglia, its varied functions, and its frequent communication with the sympathetic nervous system give it unequaled importance among the cranial nerves. It is evident from this stand-point that the pathological bearings of deranged action connected with the teeth may not be easily defined or limited.

In reflex action is found an explanation of the mutual relations of apparently unconnected disturbances. The influence of a pathological condition, acting as an irritant upon an afferent nerve, is conveyed to a related nerve-center which may from some cause be in a state of exalted sensibility, and is thence reflected along an efferent nerve, producing reflex phenomena. Reflex disturbances are variable in character, and their mechanism is not always explainable. But as efferent nerves are distributed to glands and to muscles, voluntary and involuntary, reflex phenomena generally occur in one of two principal directions,—viz, in modified secretion or muscular spasm. There may be either an increase or a diminution in the amount of secretion in the affected gland. Irritation of an abdominal nerve may lead to a suppression of the renal secretion. A mental impression, as fear or anxiety, generally produces increased renal and intestinal secretions, but arrests the salivary secretion. In the adult, reflex spasms are common, from various causes, in the stomach, at the neck of the bladder, in the urethra, in the sphincters of the vagina and rectum, in the œsophagus, larynx, bronchi, intestinal canal, ureters, and gall-duct, and notably in the uterus. Reflex muscular spasms may also originate through the agency of vaso-motor nerves acting upon the contractile walls of blood-vessels, causing either contraction or dilatation. Examples of such effects are the pallor produced by fright and the suffusion of the face and neck in blushing.

Owing to the predominance of the spinal system in infancy, this sympathy of distant organs with one another is notably greater than in adult life, creating a special tendency to the production of reflex phenomena. The exceeding mobility of the nervous system at this period is also such that a mere peripheral irritation is liable to result in sympathetic general disturbance—often, indeed, to the overshadowing of the original lesion by accessory phenomena. The profound disturbance which may be excited in an infant by even a slight functional disorder is a matter of common observation. A little irritation of the larynx will produce spasmodic croup, a little indigestible food may cause convulsions, and almost any excitant may provoke vomiting. Thus a mere interference with function may result in consequences out of all seeming proportion to the gravity of the cause. Post-mortem examinations of infants are therefore very frequently unsatisfactory, because they fail to afford any explanation in structural change of the cause of death. There is, however, in infancy, not only a predisposition to disease, owing to the weakness of the organization, but a tendency of functional derangements to excite organic changes, and thus to add new complications.

The body of an infant is not a miniature of an adult organism, but is characterized by peculiarities of structure and function. All of its organs are incompletely developed, but not uniformly so. The brain is, proportionately to size and weight, larger than in the adult, imperfect in structure, and so soft as to be almost a semi-fluid. The brain and its meninges are extremely vascular. The tissues generally are softer, more vascular, and more distended with fluids. The skeleton is for the most part cartilaginous, the muscles are gelatinous, the cellular tissues are filled with serum, and the skin is vascular and sensitive. The abdomen is disproportionately large ; the mucous membrane of the alimentary tract is soft, vascular, and hypersensitive. The mesenteric and salivary glands, the pancreas and lacteal vessels, the kidneys, supra-renal capsules, and liver, are relatively larger than in the adult. The structure of the spinal cord and nerves is more perfect than that of the brain, and therefore the functions of sensation and voluntary motion are correspondingly in advance of the functions directly dependent on the cranial nerves. The glandular, lymphatic, and capillary systems, and the nutritive system generally, are the most fully developed, and functional activity is confined chiefly to the nutritive processes. These structural and functional peculiarities explain the tendency of disease in infants to assume an inflammatory type, and also explain the facility with which morbid action is transferred by extension, metastatis, or reflection to organs not originally implicated. The liability of an irritation or inflammation of the mucous membrane of the alimentary tract to set up an analogous condition in the brain or its meninges is a familiar example of this, as is also the tendency of a morbid action in a mucous membrane to extend throughout the entire length of the affected tissue. Thus, an inflammation of the tonsils may invade the pharynx and œsophagus, the larynx and trachea,—may even follow the gastro-intestinal mucous membrane and involve the mesenteric glands. The activity of the vascular system, the free supply of blood to the tissues, the liability to effusion of serum or lymph, and the susceptibility of the nervous system, contribute to the creation of a special tendency to intense and dangerous reactions from local irritations. The balance between health and disease in an infant is delicately adjusted, and slight disturbing causes will incline it to one or the other side.

The evolution or development of the teeth commences about the seventh week of fetal life, and is continued within the jaws until (generally between the fifth and seventh months after birth) the eruption or cutting of the teeth begins,—a double process, consisting of the gradual elongation and rising of the teeth and the coincident absorption of the hard and soft tissues overlying them. The alveolar borders are the first to show signs of the absorptive process by a dissolution or melting of their approximated edges. The teeth, rising in their sockets, the roots meanwhile lengthening, press upon the overlying gums, which, becoming thinner and thinner, finally allow them to escape. It is therefore the removal of impeding tissue by absorption which permits the passage of the teeth through the gums.

Normal dentition depends upon an absolute accord between the processes of growth and absorption, as well of the crypt as of the mucous membrane covering the tooth. When, therefore, from any cause, there is a want of such accordance, the propulsive and resistive forces are in antagonism, and irritation is the result. If the eruption proceeds physiologically, the absorption of the overlying tissues is effected without the production of irritation, but an abnormal pressure arrests the absorptive process and produces congestion, tumefaction, induration, and ulceration. Thus, if the advance of the tooth is more rapid than the removal by absorption of the superimposed tissues, these act as a mechanical obstacle, and the tooth becomes in turn a mechanical irritant.

It has been urged that dentition cannot produce special discomfort, because of the comparative insensibility of the gum-tissue, and because the progressive growth of a tooth is inadequate to make sufficient pressure to cause serious distress. But this argument finds answer in tumid, tense, and shining gums ; in ulceration, in sloughs, and in the black, thickened blood which sometimes follows a touch of the lancet. It is true that normal gum-tissue is comparatively insensitive, but when inflamed it becomes exquisitely tender. The usual results of continued irritation of any tissue follow,—determination of blood, congestion, effusion, and even suppuration. (It is in such cases that "scoring"—superficial incisions—of the gums may afford an incomplete relief by lessening the capillary distention.) Under such circumstances the gums are so sensitive that the lightest touch will cause pain, so that the child on attempting to take the breast will jerk back its head, a maneuver which is frequently mistaken as an evidence of colic ; but a little attention enables the nurse to distinguish the difference between the indications of the two troubles.

Many who admit that dentition may exercise an influence on the etiology of the diseases of infancy assume that the explanation of deranged action is to be found only in the direct pressure of the advancing tooth upon the fibrous tissue, which fact is always to be determined by local signs. It is doubtless true that there is generally some such external evidence, but it does not follow, because there is no local manifestation, that therefore dental evolution can have no relation to a pathological condition. Hyperemia of the gums is perhaps generally caused by the eruption of the teeth proceeding more rapidly than the absorption of their integumental covering, and the undue pressure thus exerted may occasion trouble by the irritation of the nerves of the gum-tissue, manifested locally by soreness, tumefaction, redness, or ulceration ; systemically, by irritability, sleeplessness, fever, etc.

But the direct pressure of the advancing tooth upon the fibrous integuments is not the only nor the principal factor in disturbance of equilibrium in pathological dentition. The most serious complications are, it is reasonable to suppose, caused by the resistance of the gums, and consequent pressure upon the nervous and vascular supply of the pulp, giving rise to severe and unremitting pain,—a true toothache, comparable only to that exquisite torture which is experienced in after-life from an exposed and irritated pulp. The condition when a tooth is thus situated is not unlike that which is found in whitlow,—vascular and sensitive tissues bound down by unyielding coverings. If such a perversion of this physiological process is possible, there can be no question as to the extent of the mischief which may result,—an irritability of the general system which finds expression in loss of appetite, sleeplessness, nausea, thirst, fever, diarrhea or constipation, convulsions, paralysis, and other serious lesions ; many of which, as strabismus or epilepsy, remain throughout life.

It is not surprising that those who hold the theory generally assumed and taught, that the direct pressure of the advancing tooth upon the fibrous tissue is the explanation of all symptoms attributable to pathological dentition, should underrate the distress and danger which may occur. But the severity of the disturbance frequently witnessed suggests a more serious complication, and a consideration of the conditions justifies a graver diagnosis. It must be remembered that at the period of eruption the roots of the teeth are yet incomplete. Instead of the conical termination and minute foramen which characterize a perfected tooth, the aperture is nearly as large as the root itself, and thus when the sensitive pulp, made up of connective tissue, blood-vessels, and nerves, is in a condition of irritation because of the morbid activity of the process of dentition,—augmented vascular and nervous action,—there may be produced a hyperemia sufficient, possibly, to cause the protrusion of a part of the mass from the incomplete aperture of the root, giving abundant cause for extreme constitutional disturbance. If in the adult the irritation of a dental nerve may give rise to otalgia, otorrhea, deafness, amaurosis, hemicrania, neuralgia, hysteria, chorea, epilepsy, tetanus, etc., it is surely not only possible, but highly probable, that a like irritation may be the occasion of grave and even fatal disorders in the infant.

That this resistance of the gum-tissue is the occasion of the constitutional disturbance so often seen in teething children appears probable in view of those cases in which, though there be no local indication of trouble, every untoward symptom disappears promptly after lancing of the gums over the tooth or teeth next in order of eruption. It is almost demonstrated, negatively, by the inefficiency of hygienic measures and of systemic medication, by failure to procure relief by scoring the gums (a practice which has brought the lancet into undeserved disrepute), and positively by the immediate, apparent, almost magical, improvement which follows the removal of the cause,—viz, the pressure of the fibrous tissue upon the advancing tooth and its nervous supply. This theory makes it easy to understand how the thorough lancing of the gums over the tooth or teeth thus situated may give a relief so immediate and complete that there shall be no room for doubt as to the correctness of the diagnosis.

If these views be correct, it is evident that there may be cases in which a train of morbid symptoms presents, ending possibly in convulsions and death, without the existence of a single local indication. It is not, therefore, a sufficient reason for not lancing the gums that they exhibit neither tumefaction, redness, induration, nor the whiteness of the presenting tooth, though generally there is some external local manifestation. If, however, there be no obvious explanation for the occurrence of untoward symptoms during the period of dentition, it seems the part of wisdom to give the child the benefit of the doubt by free incisions over the tooth whose eruption is, in accordance with general laws, to be anticipated, even though there be no hyperemia of the gums ; especially as the operation causes only a trifling amount of pain, inflicts no injury, and is practically free from danger. Local indications demand the lancet ; constitutional symptoms of distress not otherwise accounted for suggest and justify it.

The manifestation of functional inharmony from pathological dentition will depend, as in trouble arising from any other disturbing cause, upon the temperament and health of the child, its dietetic management, and its hygienic surroundings. In some cases there is a gradual development of biliary, gastric, enteric, and cerebral complications ; a slow but steady loss of vital power, with no effort at recuperation, and feeble resistance to the undermining influences which gradually but surely wear out the young life. In other cases the indications of disturbance of function are manifested primarily in the nervous system ; the symptoms are all characteristic of acute derangement, and are dangerous from their violence and uncontrollability. High fever, vomiting, choleraic diarrhea, meningitis, convulsions, stupor, and death are the rapidly-succeeding phenomena. Between these two phases, chronic and acute, there is every conceivable grade of symptoms, every imaginable complication. Many disorders occurring during dentition are not incident to, but coincident with, this process, and it frequently requires a nice discrimination to determine the rôle of the teething process in the causation of morbid manifestations at this period.

Usually, the first indication of the advance of the teeth is an increased flow of saliva,—a healthy manifestation, as it serves to keep the mouth moist and cool. This increased flow of saliva, called "drooling," is doubtless due to the irritation of the trifacial nerve, which is sensory to the teeth and nutrient to the salivary glands. As the itching or discomfort increases, the child is observed to be disposed to carry its fingers or anything which it may have in its hands to the mouth, as though a sense of slight irritation were relieved by rubbing or pressure, and an evident satisfaction is experienced by the child if the gums are rubbed gently by the nurse. If the discomfort becomes more pronounced, the mouth is likely to be hot and dry, and more or less febrile excitement is manifested. Frequently a diarrhea ensues, which, if not too severe or protracted, is beneficial rather than hurtful,—requiring care, however, that it does not itself become a source of danger. An unusual redness of one or both cheeks, sometimes changing from one to the other, is a frequent symptom of nervous disturbance. Eruptions are apt to appear,—usually on the cheeks, but sometimes on the head or even over the whole body,—or ulcerations on the tongue, lips, gums, and inside of the cheeks. Itching of the nose, twitching of the muscles, dilatation of the pupils, fretfulness, restless sleep or wakefulness, thirst, and loss of appetite, are evidences of increasing irritation. A swelling of the cheek, with more or less redness, may result from a congestion of the gum over an erupting tooth, implicating also the cellular tissue. If the eruption of the tooth is still delayed, the child becomes more uneasy, troublesome, peevish, cross, and even vindictive ; cries when awake, or stops crying only to scream ; moans when asleep ; thrusts its thumb or finger between its jaws ; refuses to be amused, and treats the effort as an indignity ; throws down its toys when handed to it as though in a passion, and is outraged by any attempt at diversion ; compresses its lips ; corrugates its brow ; shows an intolerance of light ; pulls at its hair or ears ; attempts to slap or scratch its nurse ; refuses its food, or vomits it if swallowed. Associated with these indications, some or all, or quickly succeeding them, are persistent nausea and diarrhea, fever, thirst, convulsions, or other systemic complications.

If the theory be correct that in such cases the trouble is mechanical and local, it would appear to be a folly to seek relief for the child by general medication, by relaxants, derivatives, calmatives, febrifuges, local emollients, fomentations, anodynes, etc., before the local and mechanical requirements had received the proper attention ; though of course the judicious treatment of pathological dentition should in all cases include special hygienic care and medication if required, with the view of securing a perfect equilibrium of all the functions.

A familiarity with dental evolution is necessary to a proper appreciation of the probabilities in a given case ; for although there is not absolute uniformity in the order of eruption, the normal sequence will afford a basis for approximately correct interference. The period and order of eruption of the deciduous teeth are among the elementary facts with which every practitioner—indeed, every parent—should be familiar. The rule is that the lower teeth precede the upper of the same class by two or three months, but not infrequently the upper precede the lower by the same difference in time. Again, the rule is that the teeth are erupted in pairs, with an interval between the different pairs, but occasionally two or three pairs erupt concurrently. Still again, the rule is that the amount of irritation holds a relation to the number of teeth advancing simultaneously, but owing to varying susceptibility a single tooth may cause more disturbance in one case than a half-dozen will in another. The usual order of eruption is as follows, the lower preceding the upper : Central incisors, fifth to eighth month ; lateral incisors, seventh to tenth month ; first molars, twelfth to sixteenth month ; cuspids, fourteenth to twentieth month ; second molars, twentieth to thirtieth month. There is occasionally great deviation from regular order as well as from usual time in the eruptive process. Anomalous cases are those in which one or more teeth are found erupted at birth, and those in which no teeth appear until long after the usual period,—as sometimes happens, not until the second or even the third year. Premature dentition is more apt than a tardy eruption to be attended by constitutional disturbances,—precocity being an evidence of weakness rather than of strength, not alone in the child, but in the character of the denture. It is also worthy of note that when the eruption of all of the teeth is delayed, the process, when once begun, is likely to be rapidly completed, and generally with but little disturbance to health. Exceptions to this rule are cases in which late dentition is associated with tardy and imperfect development of the body generally, because of feeble vitality or constitutional disease.

If the positions assumed as to the etiology of the morbid phenomena connected with dentition be correct, it follows that the lancing of the gums over the erupting tooth is the procedure which should be promptly resorted to as that most essential and most likely to afford quick relief, unless, indeed, it can be shown that there are valid objections to the operation.

The objection most frequently urged is that unless the tooth is erupted before there is time for the wound to heal, a cicatricial tissue is formed which offers increased resistance. This argument is in contravention of recognized facts as to the reparative process. Cicatricial tissue is always of a lower degree of organization than the original structure, and consequently easier of absorption. The uniting medium in the repair of a solution of continuity possesses less vitality, is less perfectly nourished, and is easier of disintegration than the original tissue. The tendency of scar-tissue to break down is a matter of common observation even among the laity, and except in the case of gum-lancing is not disputed by any medical authority. Gum-tissue offers no exception to the general rule.

The possibility of serious hemorrhage following the operation is sometimes urged as an objection, but the argument applies with equal force not only to every surgical operation, but to all medication. If every possible fatality resulting from idiosyncrasy or unexpected complications is to be considered as contraindicating medical or surgical interference, the sphere of the surgeon and physician will be notably narrowed. Granting that it is among the possibilities that a child may die from hemorrhage following the lancing of the gums, it must also be admitted that occasionally an adult dies from hemorrhage following tooth-extraction ; but, except in cases of known hemorrhagic diathesis, this liability is never taken into account. A suggestion of such diathesis or of hereditary probabilities it would of course be well to heed. In such cases, the administration of the tincture of iron and of erigeron or ergot for a few days previous to lancing would lessen the liability to hemorrhage. The cases in which any serious trouble has resulted from hemorrhage following the lancing of the gums must be very rare, and it seems improbable that even a threatening hemorrhage could not be controlled by judicious treatment.

A further argument against lancing is based on the occasional necessity for a frequent repetition of the operation ; but the reasoning applies with equal force to any medication which fails to secure permanent relief in a given derangement likely in the nature of things or under special circumstances to demand a repetition.

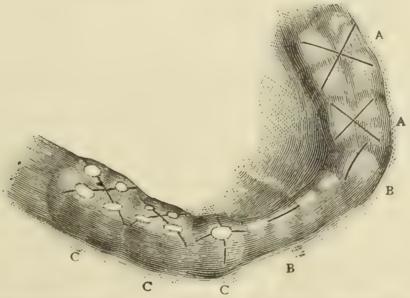
The possibility of injury to the developing tooth is an objection not infrequently made to the use of the gum-lancet, but only an ignorance of the anatomy of the mouth inexcusable in any dentist or physician could lead to the infliction of permanent injury. The probability of complication in erysipelatous or diphtheritic conditions is of course admitted, and such manifestations should be regarded as contraindicating the operation.

In addition to the objections noted, the suggestion of lancing the gums meets frequently strong opposition on the part of mothers, because of their dread of the infliction of suffering upon tender babes. But that the amount of pain caused is of the most trifling character may be inferred from the readiness with which a child old enough to appreciate conditions submits to the operation after it has once realized its benefits. Even though a momentary suffering were considerable, the resultant relief is so immediate, complete, and permanent in most cases that it would be cruelty in the extreme to withhold the lancet.

Lastly, the argument which even professional men use, that thousands of children erupt their teeth without recourse being had to the lancet, is hardly entitled to serious notice. Thousands of women become mothers without the aid of a physician, and there are many practitioners who never use obstetric forceps, but obstetricians and obstetric forceps are nevertheless often necessary. All the arguments noted are offset by the consideration that many infants' lives are probably sacrificed yearly because of popular and professional prejudice against lancing ; while, on the other hand, it will not be claimed that death, or even serious trouble, results in one case in thousands from the performance of this simple operation. The suffering, even if unnecessary, is very trifling, the risk hardly computable.

An examination of the mouth should always be made in any case of illness not plainly accounted for occurring during the teething period. Even in this simple procedure regard should be had to the number of teeth, if any, already erupted, so that the finger may be introduced with reference to avoiding unnecessary contact with sore or inflamed gums. If no teeth have been erupted, the gums over the incisors should not be pressed upon, but the finger should be introduced at the corner of the mouth. On the other hand, if one or more of the incisors are in place, the finger should be introduced at the front.

The operation of lancing the gums should, when necessary, be performed in the spirit of the adage, "What is worth doing at all is worth doing well.'' The operator should be seated directly in front of the assistant, the knees of the two parties corresponding in height. Some direct the child to be held crosswise on the lap of the assistant ; others prefer to be behind the head of the child to operate on the left side, and in front to operate on the right side of either jaw. Others take the head on their knees when operating on the upper jaw, and place the head on the knees of the assistant for operation on the lower jaw. In any case, the child should be held with such relation to the window or to the artificial light that the parts to be operated upon may be illuminated to the best advantage. The instrument employed should be a curved double-edged bistoury, so protected by wrapping the blade as to avoid injury to the tongue, lips, or cheek. The left hand of the operator should separate the jaws, and protect the tongue and lips of the child in such manner that any unexpected movement may result in injury to his own fingers rather than to the child. In the case of a child disposed to bite, the insertion of a small cork between the jaws will be of service. This should be guarded from falling into the throat by a piece of string or tape, and should be held in the desired position by the assistant.



Showing lines of incision in lancing. A, A, over the molars ; B, B, over the cuspids and incisors before eruption ; C, C, C, over the molars and cuspids after partial eruption.

The manner in which this trifling operation is performed has much to do with its success or failure. As has been already stated, the object is not merely nor chiefly to induce a flow of blood, but to remove tension. The cuts should therefore be made with special reference to the form of the erupting tooth, and should be sufficiently deep to reach the presenting surface and extend fully up to and a little beyond its boundaries, so as to insure its entire liberation. Only an *undue* force will be likely to injure the incompletely solidified enamel of the tooth, or endanger the germs of the developing permanent tooth. It is well always to direct the point of the lance toward the lips, instead of toward the lingual or palatal surface of the oral teeth, as there is thus less liability to injure the crypts of the permanent teeth if from any cause the cut should be made deeper than intended. The incisors and cuspids need only a division of the gum in the line of the arch. The molars require a crucial incision, the center of the crown, as near as can be determined, indicating the point of decussation. (See figure.)

Partial eruption of a tooth is generally accepted as a solution of the problem, the slightest presentation being considered as definitely deciding against the necessity for lancing. This is generally true in the case of the incisors,—far from true of the cuspids and molars. The cone shape of the cuspids insures a persistence of the trouble, from pressure of the inclosing ring of gum, until fully erupted. A complete severance of this fibrous ring on the anterior and posterior as well as lateral surfaces is indicated, and is even more necessary than before the partial eruption of the tooth. A cuspid is indeed rarely the cause of irritation until after the eruption of its point. All the cusps of a molar may have erupted, and yet strong bands of fibrous integument maintain a resistance as decided as before their appearance. In this case either the boundaries of the tooth should be traced by the lancet, and all such bands severed around its outlines, or a crucial incision should be made so as to insure perfect release from pressure. In extreme or urgent cases it is sometimes advisable to seize the gum over a presenting molar with a tenaculum and cut out a square block of gum, so as fully to expose the whole articulating surface of the tooth. If the wound should heal readily and the symptoms point to a renewal of the irritation, an early repetition of the operation will be advisable, and may be resorted to with advantage at short intervals until the tooth has completely erupted.

Persistent bleeding after lancing, though infrequent, has occurred, and is probably due generally to the sucking of the gums provoked by the taste of the blood. In such cases the substitution of the nipple of the nurse will give the child better employment. The extent of the hemorrhage can be ascertained by touching the wound occasionally with the napkin-covered finger. If the child should refuse to nurse, it can be prevented sucking its gums by the introduction of any soft substance, such as a roll of linen or muslin placed like a bit in the mouth and kept in position by attachments of tape tied around the head. If the bleeding continues longer than seems desirable, a little very finely powdered alum may be rubbed into the cuts, and will generally be all that is required to control the bleeding. Tannic acid may be employed in the same manner; or fibers of cotton which have been moistened and dusted with one of the vegetable or mineral astringents may be packed into the cuts; or styptic colloid—a saturated solution of tannin and gun-cotton in ether—may be applied with a minute camel's-hair brush over the wounds; or some one of the numerous remedies which act mechanically may be used : lycoperdon, puff-ball, matico, resin in powder, burnt cork, and spider's web are familiar examples. Pressure with the finger over the cuts would be an efficient procedure. As a last resort, the actual cautery would promise relief. Nitrate of silver or the perchloride or persulphate of iron should never be used, because of their liability to cause a slough and consequent secondary hemorrhage more difficult to control than the primary bleeding. In an extreme case, to divert the circulation to other parts of the body, hot foot-baths or mustard cataplasms to the extremities may be resorted to, and the feet and limbs kept warm by the application of a heated brick or flat-iron or by a bottle of hot water. In a case of hemorrhagic diathesis, where a slight oozing of blood persists in spite of local treatment, it would be necessary to administer remedies intended to correct an abnormal condition of the blood and to promote contractility of the blood-vessels. Of the former, the tincture of the muriate of iron is probably the most efficient ; of the latter, acetate of lead, aromatic sulphuric acid, gallic acid, ergot, erigeron, and turpentine are of the class from which benefit might be expected. Both indications would be met in the following formula :

℞—Tinct. ferri chloridi, fʒss ;
Acid. acetic. dil., fʒj ;
Liq. ammonii acet., fʒj ;
Ext. ergot. fld., fʒij ;
Syr. simp., f℥ss ;
Aquæ, q. s. ad f℥iij. M.

Dose, a teaspoonful every three hours for a child six months old.

To promote as far as possible the normal eruption of the teeth, the requirements which are advisable for the general welfare of the child are indicated with added emphasis,—proper clothing, suitable food, abundance of sleep, fresh air and sunshine, judicious ventilation of the nursery, cleanliness, the avoidance of draughts, of nostrums, and sleeping-drops, and especially of everything calculated to excite mental and emotional activity. An infant should always have a bed, crib, or cradle, and should never sleep in the bed with the mother or nurse. In this connection it may be noted that a cradle without rockers is to be preferred, and the same objections which apply to cradle-rocking apply with equal force to the senseless jolting upon the knee of the nurse so commonly practiced. Infants should be allowed to lie in their cribs a considerable portion of the time, instead of being held in the arms and against the person of the nurse. Cleanliness of the nurse in person and clothing is next in importance to the cleanliness of the child in its influence upon the health of the latter. A teething child should have more than usual hygienic care, more than usual freedom from all avoidable disturbing influences ; for whatever tends, by modifying the general health unfavorably, to lower the resisting power of the organism, may readily convert the natural and otherwise easy course of dentition into one of pain and danger. There is unquestionably during the period of dentition an increased susceptibility to nervous and digestive troubles, requiring more than ordinary watchfulness on the part of the mother. Causes which at other times might have no appreciable effect may then be productive of danger. Anything which introduces inharmony into the functions of animal life may result in a disturbance of the processes of dentition.

The brain and nervous system of a child need no stimulation. The danger is that that they will develop too rapidly, diverting nutrition from the organic functions and creating a tendency to reflex disturbances which may be excited by trivial causes and lead to disastrous results. The prevailing type of infancy is, it has been said, "big heads, little bodies, and feeble digestive power." Certainly, the tendency of to-day is to a premature activity of the brain at the expense of the organic functions,—"to more nervous energy and mental activity, but less physical vitality and less power of endurance. The balance of structure and harmony of function in organization is thus radically changed, and carried to an intense development of nervous tissue which in its very nature is unfavorable to the preservation of offspring."

The clothing of an infant should be such as, while not interfering with respiration and muscular action, will protect the entire body, especially the legs and feet. A fine soft flannel next to the skin, worn in winter and summer, will protect the body from variations of temperature and do much toward preventing catarrhal and other troubles. An entire change of clothing at night is desirable, and in warmth should be at least equal to that worn during the day. As a rule, the heads of children are kept too warm, and the legs and feet are insufficiently protected in out-door exposure. But, indoors or out, bare neck, arms, or legs should never be permitted. All changes in the clothing or food of a child should be made gradually, so as not unnecessarily to disturb its functions.

The food of an infant for the first few months after birth should consist exclusively of milk. Always, when possible, it should be nursed by the mother; when that is impracticable, by a wet-nurse. But the mother or the nurse must herself be in good health, or her milk may be unwholesome. Undue fatigue, excitement, or improper diet may not only interfere with the secretion as to quantity, but destroy its nutritive properties and render it harmful to the infant. When human milk cannot be obtained, cow's milk should be substituted. Condensed milk may answer for a short time and under peculiar circumstances, when fresh and pure milk of the cow cannot be obtained, but should not be relied upon as a steady diet. When circumstances make it desirable to give condensed milk, care should be taken that it be not used in excess. A small teaspoonful is enough to make four ounces of rich milk. Barley-water makes a useful diluent for this preparation. Arrowroot, corn-starch, and other farinaceous foods are positively injurious to a child under three months of age. The secretion of saliva before that period is scant, and is, moreover, deficient in the property which is essential to produce the change required in starchy foods to fit them for digestion ; and this property is not fully developed in the saliva until the child is about a year old. A very small quantity of one of the farinaceous preparations may be advantageously added to milk, simply to prevent the tendency to the formation of large curds, but in any considerable quantity it is absolutely hurtful, and dependence upon farinaceous food as a staple will almost surely produce intestinal trouble. It will fail, moreover, to supply the essential elements for the building of the osseous and muscular structures. As a food it only makes fat and produces heat. After the child is nine months of age, if weaned, milk should still be made the staple, but the diet may be varied by the addition of oatmeal boiled to a jelly, wheaten grits, barley flour, rice, farina, sago, bread-crumbs, the yelk of egg with milk, and chicken or mutton broth. After two years of age, bread and butter, baked potatoes, and ripe fruits may be gradually added. But milk should still be the staple until three years of age. While, on the one hand, confinement to any one article of food, unless it be pure rich milk, should be avoided, and a varied diet allowed, care should be taken, on the other hand, to exclude those substances which contain but little nutriment or are difficult of digestion, such as pastry, confectionery (unless of the simplest forms), cabbage, turnips, the skins or rinds of fruits, etc. Most children are fed too often and too much. The resulting indigestion is the fruitful cause of disorders of the stomach and bowels, and if such disturbance be added to the prostrating effects of summer weather, and especially at the teething period, a formidable complication is presented. Too much stress can hardly be placed on the evil of overfeeding,—a mistake so common that intelligent observers have estimated it as the chief cause of the mortality of infancy. No uniform rule can be laid down as to the quantity of food to be allowed. The amount will vary with the age and constitution of the child. As an approximate guide, it may be assumed that a healthy infant will require from twelve to sixteen fluidounces daily during the first month, increasing during the second and third months to twenty-four ounces, and after that to two or even three pints. Of course, strength and quantity bear a relation which must be taken into the account. For infants brought up by hand, the addition of lime-water to the milk neutralizes the acid secretions of the stomach and intestines, and serves to prevent colic and diarrhea. To boil milk makes it more difficult of digestion.

The amount of dilution which cow's milk should receive depends on the character of the milk and the age and condition of the child. If the milk be pure and rich, it should be diluted one-half for the first six weeks of life, and one-third from six weeks to four months. As long as milk forms the staple of the feeding, the addition of lime-water to each meal's allowance will be beneficial.

Within the limits designated it is well to vary the food of a child artificially fed, and all its food should be moderately salted. The addition of some mucilaginous article, such as gum-acacia or gelatine, is highly recommended by some practitioners. Pure, cool (not cold) water is generally very acceptable to an infant, and happily supplies the physiological demand for fluids and prevents it from overloading its stomach in nursing. It should be remembered that milk rapidly absorbs odors and septic germs, and quickly ferments and sours. It should be kept in scrupulously clean vessels and intelligently guarded from all contaminating influences. Unless assured of its perfect sweetness, it would be well always to test it by litmus-paper. Scrupulous cleanliness of the nursing-bottle is required. The plain white glass feeding-bottle with a rubber nipple as sold in the shops is to be preferred to all complex feeding apparatus with glass or rubber tubing, and the child should be encouraged to use it until of an age when solid or semi-solid food may be allowed. The bottle should never be used a second time without previous washing with scalding water, after which it should be filled with a solution of bicarbonate of soda, and this should be allowed to remain in it until it is again wanted for use. It is well to keep both bottle and nipple in duplicate, and use them alternately. The rubber nipple should be turned inside out after using, washed clean, and kept in a solution of bicarbonate of soda until again needed.

To discuss the various theories relating to the best substitute for woman's milk would far outrun the limits of this paper. An excellent formula is that proposed by the late Dr. J. Forsyth Meigs,—equal parts of milk, cream, lime-water, and oatmeal, barley- or arrowroot-water, a little sugar of milk being added. The barley may be employed preferably for children who manifest a tendency to diarrhea, the oatmeal for those who have a tendency to constipation, changing from one to the other according to changes in the intestinal functions. The oatmeal or barley should be thoroughly boiled,—a teaspoonful of either to a pint of water evaporated by boiling, preferably in a water-bath, to half the quantity, and strained through muslin. With some children cracked wheat, treated in the same manner, seems to answer better than either oatmeal or barley. If a tendency to constipation is not overcome by the use of oatmeal as suggested, the administration of sweet oil two or three times daily, in doses of from twenty drops to a teaspoonful according to age, will probably correct the difficulty. In adynamic or scrofulous conditions, cod-liver oil might be substituted with advantage. Dr. Arthur V. Meigs recommends two parts of cream, one of milk, two of lime-water, and three parts of a solution of sugar of milk of the strength of 17¾ drachms to the pint of water.

Meigs and Pepper* recommend a preparation made by dissolving a small quantity of prepared gelatine or Russian isinglass in water, to which is added milk, cream, and a little arrowroot or any other farinaceous substance that may be preferred. They say, "We have given this food to a great many children during the last twenty-five years, as well to those brought up by hand as those partly suckled or weaned, and can truly state that they have thriven better upon it than upon anything else we have employed." The mode of preparation and the proportions are as follows: "A scruple of gelatine (or a piece two inches square of the flat cake in which it is sold) is soaked for a short time in cold water, and then boiled in half a pint of water until it dissolves,—about ten or fifteen minutes. To this is added with constant stirring, and just at the termination of the boiling, the milk and arrowroot, the latter being previously mixed into a paste with a little cold water. After the addition of the milk and arrowroot, and just before the removal from the fire, the cream is poured in and a moderate quantity of loaf sugar added. The proportions of milk, cream, and arrowroot must depend on the age and digestive power of the child. For a healthy infant within the month we usually direct from three to four ounces of milk, half an ounce to an ounce of cream, and a teaspoonful of arrowroot to a half-pint of water. For older children the quantity of milk and cream should be gradually increased to a half or two-thirds milk and from one to two ounces of cream. We seldom increase the quantity of gelatine or arrowroot."

Dr. Eustace Smith speaks highly of "barley jelly," made as follows: Put two tablespoonfuls of washed pearl barley into a pint and a half of water, and boil down to a pint; next strain out the barley, and let the liquid set to a jelly. Two teaspoonfuls of this dissolved in eight fluidounces of warmed and sweetened milk are enough for a single feeding, and such a meal may be allowed twice a day after the eighth month.

The following is the formula suggested by Prof. Leeds, of Stevens Institute, as the best substitute for woman's milk:

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* "Practical Treatise on the Diseases of Children."

1 gill of cow's milk, fresh and unskimmed;
1 " of water;
2 tablespoonfuls of rich cream;
200 grains of milk-sugar;
1¼ " of extractum pancreatis;
4 " of sodium bicarbonate.

Put these in a nursing-bottle; place the bottle in water made so warm that the whole hand cannot be held in it without pain longer than one minute. Keep the milk at this temperature for twenty minutes. The milk should be prepared just before using.

Dr. J. M. Keating considers that pancreatized milk has solved the much-discussed problem of the artificial feeding of children, and does not think that there is any occasion to ask or look for a more suitable food. He gives the following directions for its preparation: In a gill of water dissolve five grains of extractum pancreatis; add this to a pint of milk at a temperature of 110° F. The pancreatin is first put in water, because it contains a curdling ferment that is weakened by water; or the baby's bottle can be filled with milk and brought to the proper temperature by setting it in warm water, and the solution of pancreatin added in proper proportion,—namely, a gill to a pint.

An old-time formula, which has been recently indorsed by Dr. J. Lewis Smith, is as follows: Pack a pound of dry wheat flour, preferably unbolted, into a firm muslin bag; tie the neck of the bag so as to confine the flour tightly, and place it in a suitable vessel, in which it is to be covered with water and boiled constantly for ten hours. After it is removed, hang the bag up to dry. The outer part of the flour ball can then be peeled off, leaving a lump looking something like yellow chalk. This should be scraped into a powder, a tablespoonful of which should be mixed with twelve tablespoonfuls of water and heated. For a child six months of age, half a teaspoonful of extract of malt and a little salt should be added. White of egg or a little raw beef-juice may be added if more nourishment is needed. This food may be resorted to when a change seems desirable, especially when the bowels are out of order, or may be alternated with peptonized milk.

Dr. Louis Starr gives the following directions for the preparation of "flour-ball" food: Rub a teaspoonful of the powder with a tablespoonful of milk into a smooth paste, then add a second tablespoonful of milk, constantly rubbing until a cream-like mixture is obtained; this is poured into eight ounces of hot milk, stirring well, and is then ready for use.

Dr. Eustace Smith recommends the following preparation, which he considers especially useful to supplement the mother's milk when that is insufficient: One tablespoonful of cream, one of whey, and two of hot water. Whey is made by adding a large teaspoonful of wine of pepsin to a pint of fresh milk, allowing it to stand by the fire a couple of hours, then straining through muslin.

Dr. Louis Starr recommends the following as the best substitute for the mother's milk in gradual weaning of a child, say at ten months; it may also be employed to supplement the breast when the mother's milk is insufficient:

Cream, f℥ss;
Milk, f℥iiss;
Sugar of milk, ʒss;
Water, f℥j.

Should this quantity fail to satisfy the child, all the ingredients except the cream may be increased until the mixture measures six, eight, or twelve ounces.

Mellin's Infant Food is an English preparation which agrees admirably with many children. Horlick's Food, made in this country, is very similar. Either may be added in small quantity tentatively to the milk of a hand-fed infant after the fourth or fifth month.

At times milk in any and every form seems to disagree with a child. In such cases it should be withheld, and a temporary substitute given until its use can be safely resumed. Such substitutes are to be found in Mellin's and Horlick's Foods, barley jelly, broths, and beef-tea (peptonized if necessary), the white of raw eggs stirred in water, etc.

The accurate adaptation of diet is by no means an easy task in many cases, and only general rules can be given, which must be modified in individual instances where they do not seem to be successful. The object is to keep up the nutrition of the body with the least irritation to the digestive organs, and the food which will best serve these purposes is the best.

The annexed diet list* will be found of service as indicating a conservative regimen:

Diet of Children in Health.

Diet 1.—From birth to six months; if child be nursed, nurse's milk, and *no other food.*

Nurse every two hours for first six weeks; six weeks to four months, every three hours.

From four months till two, four, or six teeth are cut, every four hours, when additional food may be given. (See Diet 3.)

During the whole time of nursing, never nurse later than 11 P.M. or before 5 A.M.

After the teeth appear, no nursing at night, but continuing through the day till weaning, gradually lengthening the intervals.

Diet 2.—For infants brought up by *hand*, three or four ounces of fresh, unskimmed milk and lime-water, with one teaspoonful of sugar of milk, the mixture to be tepid.

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* Dr. E. S. Dunster.

For first six weeks, half lime-water, and every two hours.

From six weeks to four months, one-third lime-water, and every three hours.

From four months till two, four, or six teeth are cut, every four hours.

N.B.—If the infant can be only *partially* nursed, nurse twice a day, and for other meals follow Diet 2.

Diet 3.—From seventh or eighth month (when two, four, or six teeth are through) to one year, *five meals.*

6 OR 7 A.M.—A cup of *pure* milk (if digested), with two teaspoonfuls of farina, oatmeal, wheaten grits, rice or rizena, barley flour. It is well to alternate rice with oatmeal or farina.

11 A.M.—Milk with bread-crumbs, milk crackers, or rusk. Twice a week the yelk of one egg, beaten with a teacup of milk, may be given with the bread and milk, etc., juice of raw beef, heated a little, or beef-tea, chicken or mutton broth, in small quantity. At about ten months, a piece of rare beef or a chicken-bone to suck.

2 P.M.—One cup of milk, with lime-water, if necessary.

5 P.M.—Same as at 7 A.M.

11 P.M.—*If needed,* same as at 2 P.M.

A healthy child, between ten and twelve months old, requires a pint and a half to one quart of milk in twenty-four hours.

Diet 4.—From one year to eighteen months.

7 A.M.—Same as Diet 3, at 7 A.M., or with a rusk, slice of bread, well soaked in milk.

11 A.M.—A drink of milk, slice of bread and butter, rusk, or crackers.

1 P.M.—A cup of beef-tea or piece of rare beef, chicken or mutton broth, with bread, rusk, or milk crackers; a mealy potato, moistened with beef gravy; one or two tablespoonfuls of light pudding, rice, rizena, corn starch, or sago, made with milk.

6 P.M.—Same as 7 A.M.

11 P.M.—A drink of milk, *if required.*

A healthy child, between one year and eighteen months, will take two or three pints of milk in twenty-four hours.

Diet 5.—From eighteen months to two years.

7 A.M.—Cup of milk, rusk, bread and butter; occasionally yelk of one egg.

11 A.M.—A cup of milk or rice and milk, with ripe fruit occasionally.

1 P.M.—Rare beef, broths, soups not too rich, baked potatoes, with gravy, milk, or toast-water, or simply water as drink; small quantity of custard or other light pudding.

6 P.M.—Bread and butter, rice (or rizena) and milk, occasionally stewed fruit.

Between two and three years, same diet may be continued, substituting 11 A.M. and 1 P.M. meals for one at 12 M. Meat can be given every day; vegetables, except cabbage, turnips, and parsnips; morning and evening, principally milk.

The following schedule of the diet of a hand-fed infant from birth upward* will serve as a suggestive and useful guide:

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* "Diseases of the Digestive Organs in Infancy and Childhood," by Louis Starr, M.D.

Diet during the First Week.

Cream, fʒ iij ;
Sugar of milk, gr. xv ;
Whey, f℥ ss, fʒ ij ;
Water, f℥ ss, fʒ ij.

This portion to be given every two hours from 5 A.M. to 11 P.M., and in some instances once or twice during the night.

Diet from the Second to the Fifth Week.

Milk, f℥ ss ;
Cream, fʒ ij ;
Sugar of milk, gr. xv ;
Water, f℥ j.

This portion to be given every two hours from 5 A.M. to 11 P.M.

Diet from the Fifth Week to the End of the Second Month.

Milk, f℥ j, fʒ ij ;
Cream, f℥ ss ;
Sugar of milk, gr. xxx ;
Water, f℥ j, fʒ ij.

This portion to be given every two hours.

Diet during the Third Month.

Milk, f℥ iiss ;
Cream, f℥ ss ;
Sugar of milk, ʒ j ;
Water, f℥ j.

This portion to be given every two and a half hours.

Diet during the Fourth and Fifth Months.

Milk, f℥ iiiss ;
Cream, f℥ ss ;
Sugar of milk, ʒ j ;
Water, f℥ j.

This portion to be given every three hours.

Diet during the Sixth Month.

Milk, f℥ ivss ;
Cream, f℥ ss ;
Sugar of milk, ʒ j ;
Water, f℥ j.

This portion to be given four times daily. Two other meals—morning and mid-day—may be as follows :

Milk, f℥ ivss ;
Cream, f℥ ss ;
Mellin's Food, ʒ j ;
Hot water, f℥ j.

Dissolve the Mellin's Food in the hot water, and add, with stirring, to the previously-mixed milk and cream.

In the *seventh month* the Mellin's Food may be increased to two teaspoonfuls and given three times daily.

Throughout the *eighth* and *ninth months* five meals a day will be sufficient,—at 7 and 10.30 A.M., 2, 6, and 10 P.M.

Milk, f℥ viss;
Cream, f℥ ss;
Sugar of milk, ʒj;
Water, f℥ j.

This portion for the first and last meals. For the other three meals a tablespoonful of Mellin's Food may be added, or a teaspoonful of "flour ball" may be given twice daily instead of the Mellin's Food,—say at the second and fourth meals.

Diet for the Tenth and Eleventh Months.

First meal, 7 A.M.:

Milk, f℥ viiiss;
Cream, f℥ ss;
Mellin's Food, ℥ ss;
(Or "flour ball" or barley jelly, ʒ ij);
Water, f℥ j.

To be used only when Mellin's Food is employed.

Second meal, 10.30 A.M.: Eight ounces of warm milk.

Third meal, 2 P.M.: The yelk of an egg lightly boiled, with stale bread-crumbs.

Fourth meal, 6 P.M.: Same as first.

Fifth meal, 10 P.M.: Same as second.

On alternate days the third meal may consist of a teacupful (f℥ vj) of beef-tea, containing a few stale bread-crumbs.

Beef-tea for an infant is made in the following way: Half a pound of fresh rump steak, free from fat, is cut into small pieces, and put with one pint of cold water into a covered tin saucepan. This must stand by the side of the fire for four hours; then be allowed to simmer gently (never boil) for two hours, and finally be thoroughly skimmed to remove all grease.

A further variation can be made by occasionally using mutton, chicken, or veal broths instead of beef-tea.

Diet from the Twelfth to the Eighteenth Month (Five Meals per Day).

First meal, 7 A.M.: A slice of stale bread broken and soaked in a breakfast-cup (f℥ viij) of new milk.

Second meal, 10 A.M.: A teacup of milk (f℥ vj), with a soda-biscuit or thin slice of buttered bread.

Third meal, 2 P.M.: A teacupful of beef-tea (f℥ vj), with a slice of bread, one good tablespoonful of rice, and milk pudding.

Fourth meal, 6 P.M.: Same as first.

Fifth meal, 10 P.M.: One tablespoonful of Mellin's Food, with a breakfast-cupful of milk.

To alternate with this:

First meal, 7 A.M.: The yelk of an egg slightly boiled with bread-crumbs; a teacupful of new milk.

Second meal, 10 A.M.: A teacupful of milk, with a thin slice of buttered bread.

Third meal, 2 P.M.: A mashed boiled potato moistened with four tablespoonfuls of beef-tea; two good tablespoonfuls of junket.

Fourth meal, 6 P.M.: A breakfast-cupful of new milk, with a slice of bread broken up and soaked in it.

Fifth meal, 10 P.M.: Same as second.

The fifth meal is often unnecessary, and sleep should not be disturbed for it. At the same time, should the child awake an hour or more before the first meal-time, he should break his fast upon a cup of warm milk, and not be allowed to go hungry until the set breakfast hour.

Diet from Eighteen Months to the End of Two and a half Years (*Four Meals a Day*).

First meal, 7 A.M.: A breakfast-cupful of new milk; the yelk of an egg lightly boiled; two thin slices of bread and butter.

Second meal, 11 A.M.: A teacupful of milk, with a soda-biscuit.

Third meal, 2 P.M.: A breakfast-cupful of beef-tea, mutton or chicken broth; a thin slice of stale bread; a saucer of rice and milk pudding.

Fourth meal, 6.30 P.M.: A breakfast-cupful of milk with bread and butter.

On alternate days:

First meal, 7 A.M.: Two tablespoonfuls of thoroughly cooked oatmeal or wheaten grits, with sugar and cream; a teacupful of new milk.

Second meal, 11 A.M.: A teacupful of milk, with a slice of bread and butter.

Third meal, 2 P.M.: One tablespoonful of underdone mutton pounded to a paste; bread and butter, or a mashed baked potato moistened with good plain dish gravy; a saucer of junket.

Fourth meal, 6.30 P.M.: A breakfast-cupful of milk, a slice of soft milk toast, or a slice or two of bread and butter.

The foregoing schedule must, of course, be regarded as an average. Many children can bear nothing but milk food up to the age of two or even three years, and, provided enough be taken, no fear for their nutrition need be entertained. The rule to adopt is, if a child be thriving on milk he is never to be forced to take additional food merely because a certain age has been forced. Let the healthy appetite be the guide.

Unless for reasons which outweigh the disadvantages, such as the pregnancy of the nurse, a child should not be weaned until it has erupted twelve teeth. In case of the pregnancy of the nurse, it should be weaned at once. If possible to avoid it, a child should not be weaned just before or during hot weather. If there is a necessity for weaning it, compensation for the deprivation of the mother's milk would be secured to a large extent by its removal, if living in a large city, to the country or to the seaside. The extreme heat of midsummer is especially trying to infants, and choleraic symptoms, with a tendency to collapse, are frequently excited without other apparent cause. When practicable, children under twelve months of age should always have the benefit of country air during a long-continued heated term.

Derangements of health that are simply coincident with dentition are to be treated on general principles, but the liability of reflected dental irritation to exaggerate and complicate systemic disorders should always be borne in mind, and local relief afforded when indicated. The application of a saturated solution of bromide of potassium or of equal parts of phénol sodique and paregoric to the gums is soothing, and may be employed with the view of lessening whatever sense of discomfort may arise from the activity of the eruptive forces where no undue pressure upon or by the gums is suspected. In case of apparent distress arising presumably from a hyperesthetic condition of the gum-tissues, favorable results may be anticipated by brushing the surfaces at suspected points with a four per cent. solution of oleate of cocaine. In the presence of symptoms seemingly out of proportion to any recognized cause of disturbance, it would still be proper to lance the gums over the teeth next in order of eruption, though local signs did not appear to demand it.

A febrile condition—the so-called irritative fever of infancy—is produced by various and frequently by slight causes. The process of teething, indigestible food, worms, a misplaced pin, continued pressure as by a string or bandage, any considerable irritation of the cutaneous surface, will excite a more or less severe fever in proportion to the predisposing conditions present.

The nervous system in infancy is exceedingly excitable, and the sympathetic system of nerves is especially responsive. Peculiarities of the pyrexia of dentition are its severity, its irregularity, and the excitability attending it. Children are not infrequently delirious from the febrile disturbance consequent on dentition. This excitement, like all other disorders dependent upon tension from dentition, is best allayed by a removal of the tension. This is generally all that is required. If, however, the cutaneous surface becomes hot and dry, advantage will be found in bathing the child once or twice daily with warm water to which has been added alcohol, bay rum, or vinegar. Bathing the child's head frequently with cold water is an efficient aid in preventing a tendency to congestion. Inunction of the child's body with warm oil (an animal oil, or even sweet oil) has a very soothing effect, and will frequently, in hyperesthetic conditions, insure a quiet night.

If systemic treatment is required, the appropriate remedies will be refrigerants and sedatives, such as cool water, the neutral mixture, bromide of potassium, spirit of nitrous ether, compound spirit of ether, etc. An irritative fever of sufficient severity or duration to excite functional disturbance or organic changes must be treated on general principles, though the exciting cause should always be found and corrected if possible.

Spasms or convulsions may be coincident with or incident to dental evolution. Various causes, singly or in association, may produce such an irritation of the spinal centers that the co-ordinating function of the brain is overpowered, and irregular muscular actions, spasms, or convulsions may ensue. Of these causes none are more liable to act as excitants of convulsive attacks than irritations of the fifth and pneumogastric nerves. Oftener than from any other causes, spasm is the indication either of irritation in the field of distribution of the fifth nerve or of gastric or intestinal disturbance. The condition of the mouth, therefore, and of the alimentary tract is to be considered in every case of convulsions not otherwise plainly accounted for. An overloaded stomach, or the presence of indigestible food, is perhaps the most frequent factor in the etiology of eclampsia. A convulsive attack is generally preceded by unusual and irregular movements of the eyelids, twitching of the corners of the mouth, and almost always by a contraction of the toes and turning of the thumbs into the palms of the hands; frequently by a strabismus of one or both eyes, and sometimes by spasmodic movements of the limbs.

The first indication for treatment is to remove the irritation,—by the lancet, emesis, purgatives, etc., according to diagnosis. Further treatment may include the hot bath and general blood-letting, though the latter is seldom advisable. Here, again, after the removal or correction of the causative irritation, antispasmodics and nervous sedatives, such as have been enumerated, will be beneficial if judiciously employed; and to them may be added chloroform, ether, chloral, asafetida, camphor, valerian, belladonna, opium, etc., according to the condition of the little patient. As a rule, bromide of potassium is the most efficient agent, unless a more prompt remedy is required. A valuable combination is to be found in the following formula:

℞—Potassii bromid.,
Sodii bicarb., *āā*, gr. xvj;
Chloral hydrat., gr. iv–viij;
Aquæ menth. pip., f℥j. M.

Dose, a teaspoonful every two hours at six months.

The indication is to lessen the nervous excitability by controlling the nerve-centers. The tendency in the individual case should be combated according as anemia or plethora is manifested. In the one case tonics, and in the other salines and restricted diet, are indicated.

The manifestations of reflex excitability are numerous and varied. Occasionally the peripheral irritation is reflected to the genito-spinal center, causing priapism and a picking or pulling at the penis by the child. Retention or incontinence of urine and painful and difficult micturition are sometimes apparently dependent upon reflected dental irritation. In such cases demulcent drinks—barley-water, flaxseed-tea, or solution of gum-acacia, sweet spirit of niter, or citrate of potassa, and, if there is much pain, a half-drop of tincture of opium occasionally—will usually correct the condition. Spasm of the glottis (laryngismus stridulus) appears sometimes to be excited by the irritation of teething. There is reason to believe that earache is often associated with and dependent upon the difficult eruption of one or more teeth, and that, apart from the aggravation of the fever and the increased liability to convulsions incident to this added anguish, there is also the possibility of the loss of hearing (entailing in young children the loss of speech) from the congestion and inflammation which result. But this is not the only—indeed, not the chief—danger. The inflammation is liable to extend to the membranes of the brain and end in death. The facility with which an irritation originating in the mouth may be continued to the ear, and thence to the brain, can readily be understood by a recognition of the intimate relations which exist between the parts concerned and of their elaborate nervous connections. The danger is a real one, and should not be lost sight of in the treatment of a child suffering from teething. The relief of the excitant cause is here also the important ameliorative or curative procedure. There seems little room to doubt that infantile paralysis is in some instances more or less directly connected with teething. Cases are recorded of paraplegia appearing at the cutting of each tooth and disappearing after its eruption. Infantile paralysis usually takes the form of incomplete paraplegia, sometimes affecting a single group of muscles or even an individual muscle. It generally occurs suddenly. Its duration varies greatly, from a few days or weeks to months, and in some cases it persists throughout life.

In all infants, especially in those artificially fed, there is a tendency to an acid fermentation of their food, due partly to the character of the food and partly to the peculiar activity of the mucous glands, either in response to a local irritant or to a reflex impression causing a modified secretion, or to an extension of a local irritation. Flatulence, pain, vomiting, and diarrhea are the natural results of this condition of the alimentary tract. Attention to the condition of the mouth, to the hygienic management of the infant, and especially to its diet as to quantity, quality, and frequency, should precede the employment of drugs. A flannel bandage around the abdomen will serve as a derivative, and if desired may be made more effective by rubbing powdered spices or dry mustard on the surface next the belly, or by sprinkling it with turpentine mixed with sweet oil. A change or modification of diet is frequently advisable, and a change of air will often act like a charm. Under all circumstances it is well to limit the amount of food to the quantity just sufficient to sustain life, in order to afford the digestive organs physiological rest. The union of an alkali with an aromatic is indicated, and a grain of the bicarbonate of sodium or of potassium with anise, cinnamon, or caraway will prove of advantage if given with each meal until the condition is corrected. If undigested food or vitiated secretions in the alimentary tract are suspected, a dose of castor oil and aromatic syrup of rhubarb in equal portions—a teaspoonful of the mixture—will be of great service. If torpidity of the liver is diagnosed, a few doses, at intervals of two hours, of the twelfth or sixteenth of a grain of calomel, with one to two grains of sodium bicarbonate, will be likely to correct the condition. If the diarrhea persists after the action of the purgative, the following prescription may be employed, first prohibiting the use of any farinaceous or milk food. Indeed, if all food be withheld for from two to six, eight, or even ten hours, and be then given in very small quantities, the effect on the digestive tract will be very beneficial :

℞—Tinct. opii, gtt. viij :
Bismuth. subnitrat., ʒj ;
Mucilag. acaciæ, f℥ ss ;
Aquæ menth. pip., f℥ iss. M.

Dose, a teaspoonful every three hours to a child six months old.

Opium is indicated, however, only after all offending matters have been expelled from the alimentary canal. Its chief value then is to lessen peristaltic action ; but it is at best a choice of evils in the maldigestion of infancy, because of its interference with the normal secretions of the digestive fluids. Opium is sometimes beneficial when combined with small doses of a purgative,—a half-drop of laudanum to twenty or thirty drops of a mixture in equal proportions of castor oil and spiced syrup of rhubarb, given three or four times daily.

If the stools are serous and alkaline, the following mixture may be given :

℞—Acid. sulph. aromat., gtt. viij ;
Spt. vini gallici, fʒ ij ;
Syr. acaciæ,
Aquæ menth. pip., *āā*, f℥ ss. M.

Dose, a teaspoonful every two hours in a little water.

Or two drops of the wine of ipecac in an ounce of water may be given, in teaspoonful doses, every half-hour, to control the vomiting. If the irritability and vomiting are excessive, the following formula may be resorted to :

℞—Spt. chloroformi, fʒj ;
Creasoti, ♏ij ;
Vin. ipecac., ♏v ;
Aquæ anisi, q. s. ad f℥ ij. M.

Dose, a teaspoonful in a little water for a child a year old.

A diarrhea due apparently to relaxation from long-continued warm weather or succeeding to cholera infantum, and not attended by fever, is likely to be controlled by such a combination as the following :

℞—Ext. hæmatoxyli, gr. xvj ;
Tinct. opii camph., fʒj ;
Mist. cretæ,
Aquæ cinnamomi, *āā*, f℥j. M.

Dose, a teaspoonful in water every four hours for a child six months old.

If the diarrhea seems to depend upon reflex nervous impression, sedative treatment is indicated, and bromide of potassium, liquor potassii citratis, liq. ammonii acetatis, compound spirit of ether, the camphorated tincture of opium, and even depressants, such as aconite or veratrum viride, may be required ; but the latter class of drugs should be given in very small doses and the effects carefully watched.

A diarrhea dependent on reflex action from dental irritation and consequent irritability of the nerve-centers is usually characterized by profuse and watery dejections (which have a sour smell, indicative of fermentation, caused probably by an arrest of the functions of the intestinal glands), by irritable stomach, anorexia, hot head, cold hands and feet, fretfulness of temper, and restlessness. These conditions, if not corrected, are likely to eventuate in convulsions or congestion of the brain, but are frequently promptly relieved by remedies addressed especially to the nervous system. A combination of bromide and nitrate of potassium is an efficient remedy in such cases :

℞—Potassii bromidi, gr. xviij–ʒss ;
Potassii nitratis, gr. vj ;
Sacchari lactis, ʒss.

M. ft. pulv. vj.

One of these powders may be given every three or four hours to a child one year of age.

Dr. Lees, of London, has called attention to a class of cases not very uncommon in children, in which the main symptom is the frequent passage of semi-solid stools, generally containing undigested food. Dr. Lees considered that these symptoms were due to a hyperperistalsis of the alimentary canal from irritation of the vagus nerve which supplies the excitor fibers to the intestine, the splanchnics conveying the inhibitory fibers. The proximity of the nucleus of the vagus to that of the trigeminus in the medulla indicated the possibility that this increased excitability of the intestine might be due to dental irritation. On the theory of the purely neurotic origin of the symptoms he treated these cases with bromide of potassium simply, without opium or astringents, and with immediate success.

Dr. Christopher Elliott recommends the infusion of chamomile-flowers as highly beneficial in infantile diarrhea when proceeding from dentition, and when the stools are greenish in color or are slimy and streaked with blood. It will quickly calm a fretful child. The dose of the infusion is a half to one drachm for a child under one year; for a child over that age, double, three times a day or oftener according to the severity of the attack. The rationale of the treatment is the power which chamomile-flowers possess of subduing reflex excitability, this power belonging to the volatile oil they contain.

Constipation, whether incident to or coincident with teething, is, if obstinate, to be treated with laxative enemata, suppositories of cacao butter, tallow, or molasses candy, or by castor oil by the stomach or by abdominal inunction. A persistent tendency to constipation may be combated by the administration of cod-liver oil, beginning with ten-drop doses three times daily, and increasing, if necessary, to a small teaspoonful. Further treatment, if the troubles persist, should follow on general principles.

Inflammation of the mucous membrane of the mouth, with an increased acidity of the secretions, is a common pathological affection in infants, especially in those artificially fed, and still more especially in those accustomed to farinaceous foods. Varieties in expression of such disorders are designated, according to their character, as simple or erythematous stomatitis, follicular stomatitis or aphthæ, ulcerative stomatitis, gangrene of the mouth, and thrush. Either of these forms may be coincident with, if not incident to, dentition, and may therefore receive brief notice in this connection. Some of them are always, any of them are likely to be, associated with, if not caused by, gastric and intestinal derangement. The simple form requires only the use of demulcent and mildly astringent lotions applied gently to the parts by a camel's-hair brush or by a soft linen rag on the finger, so as to avoid injury to the mucous membrane. Aphthæ occur in two forms, —the discrete and the confluent. The simple form is usually accompanied by symptoms of gastric derangement, requiring regulation of the diet and possibly laxatives. The local treatment indicated is demulcents and astringent washes. Glycerin and borax or alum, combined, are efficacious as local applications. The ulcers in the confluent form may require in addition a light application of a stick of nitrate of silver, and in morbid systemic conditions the administration of tonics and stimulants, such as iron, quinia, and brandy. Ulcerative membranous stomatitis (the cancrum oris of some writers) is supposed to be due to epidemic influences, and is sometimes fatal by reason of its extension to the pharynx and larynx. The treatment consists of regulation of the bowels, simple but nutritious food, tonics, and chlorate of potassium, conjoined with demulcent washes and astringent applications. Gangrene is a rare disease in private practice, but not infrequent in hospitals for children. It requires the most energetic nutritive, tonic, and stimulant systemic treatment and escharotics locally. Thrush is generally dependent upon a morbid condition of the digestive functions, and is almost never found in children who have been exclusively suckled. The disease is associated with the growth of a peculiar fungus, the *Oidium albicans.* It is comparatively rare, except in hospitals and among the children of those who are too poor to give them proper attention, and those fed on feculent food. The severe form is attended with fever, colic, diarrhea, and vomiting, and sometimes death results from abdominal complications. The abandonment of improper food and the substitution of proper alimentation are first necessary, following with remedies addressed to the correction of the disordered condition of the alimentary canal, and astringent applications locally. In any of these varieties of disease in the mucous membrane of the mouth the employment of solutions of the sulphite of sodium and of phénol sodique, of strength according to indications,—say, as in the following formulæ,—promises favorable results so far as local treatment is concerned :

℞—Sodii sulphitis, gr. xxx ;
Glycerini,
Aquæ, *āā*, f℥ ss. M.

℞—Phénol sodique, f℥ ss ;
Glycerini,
Aquæ, *āā*, f℥ iss. M.

Either formula may be used on a swab every two hours.

Syphilitic stomatitis requires specific treatment.

Cool applications to the mouth are always agreeable and beneficial. The child may be allowed to suck small pieces of ice, or the mouth may be frequently syringed with ice-water.

Cutaneous eruptions frequently occur during the period of dentition. These may be symptomatic or idiopathic, from local or constitutional causes. Heredity, predisposition, improper food or excess in feeding, derangement of the alimentary tract, uncleanliness or too frequent bathing, strongly alkaline or impure soap, or too much friction in washing or drying the child, excessive swaddling and consequent heating and sweating, clothing too tightly worn or of irritating material, or made so by dyes used in its manufacture, may produce a cutaneous disease. Derangement of the nervous system, of which dentition may be the exciting cause, is accountable for a variety of cutaneous disorders ; but while dental irritation may thus indirectly develop a skin-disease, the treatment, except in so far as the removal or correction of the exciting cause is concerned, differs not from that which would be proper if a like disturbance of the nervous system from any other cause had resulted in a like pathological condition.

CORRECTING IRREGULARITIES OF THE TEETH.

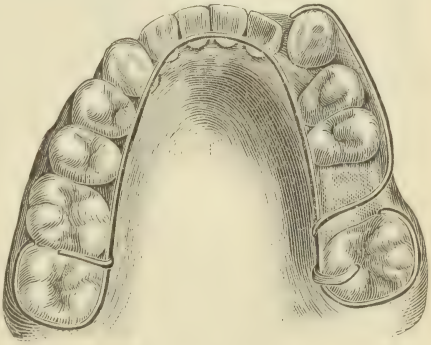
BY V. H. JACKSON, M.D., D.D.S., NEW YORK, N. Y.

(Read before the International Medical Congress at Berlin.)

THERE have been presented to the profession by dental specialists from time to time new systems for correcting irregularities of the teeth. Each has received more or less attention, and some of them will continue to be of service as long as irregularities need correction.

Orthodontia will no doubt eventually become a distinct specialty of dentistry, but it is necessary at present for the general practitioner to be more or less familiar with the systems in use, in order that he may choose that which will be the most effective in a given case and require the least outlay in construction. It is my purpose in this brief paper to describe and demonstrate with models and apparatus some methods of applying removable springs without the use of a plate for regulating teeth, describing methods that I am using daily, and with which I have attained good results in a limited time, and in passing I desire to express a growing confidence in the use of the removable spring for moving teeth. Piano-wire is at present the best spring for the purpose, although spring gold, silver, and German silver are often applicable, especially if the temper is not drawn while soldering, and that can be avoided in some cases by keeping the spring portion cool, or by using soft solder, which is usually preferable.

FIG. 1.



The difficulty experienced in regulating the teeth of the lower arch often prompts the dentist to delay the operation from time to time, and more often to avoid even its consideration.

I have been using for a considerable length of time, as is known by some of the gentlemen present, metal spring appliances that are also applicable for the correction of irregularities of the teeth in the lower arch, cases of which I shall first briefly describe.

FIG. 1.—In the model here presented it will be seen that the right inferior cuspid was much too prominent, and articulated outside of the upper teeth, there being insufficient space for it in the arch.

The first molar was extracted, as it was defective, and a piano-wire was formed to the lingual side of the teeth in the arch, following the line of the gum to the distal tooth on either side, around which the ends were formed to clasp. The gum was very prominent just back of the molars, and accordingly the plaster model on which the appliance was formed was then carved slightly to allow the spring to more perfectly clasp about the necks of the teeth.

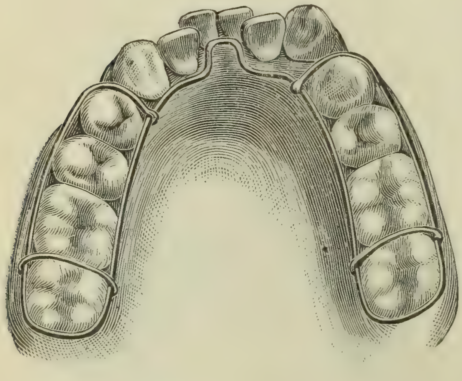
A second spring wire was then formed to join the one described, and pass just in front of the second molar through the space made by the extraction of the first molar, and extend forward, terminating in a curve on the anterior surface of the prominent cuspid.

The two spring wires were then joined with soft solder, having first wound the part forming the joint with small copper wire. The whole appliance can, if desired, be plated by immersion in melted tin.

The pressure of the spring was regulated by bending it toward or from the main wire, and by curving the end. The tension was such as to draw the cuspid and bicuspids backward, and move the cuspid into proper line within a month's time.

A variety of methods have been adopted to keep this form of appliance from pressing on the gum and slipping off from the teeth. Some of these have been published. The principal forms were wire points soldered to the main wire and reaching into the spaces between the teeth to keep the appliance from slipping off, and a similar wire extended on to the grinding-surface, usually at the junction of two teeth, to keep the fixture from pressing on the gum.

FIG. 2.



This system has proven to be, for a certain class of cases, the most rapid in moving the teeth, and of the least inconvenience to the patient and operator of any yet used. The inner bar can be stiffened at any place desired by winding with binding-wire, and flowing over it tin or soft solder, or an extra wire can be added in a similar manner at any stage of the operation.

A spring can extend from the main wire to either side of the arch to move teeth out into line, or to the labial side of the arch to force prominent teeth back to a proper position, or be adapted to rotate one or more incisors by pressing them against the main wire.

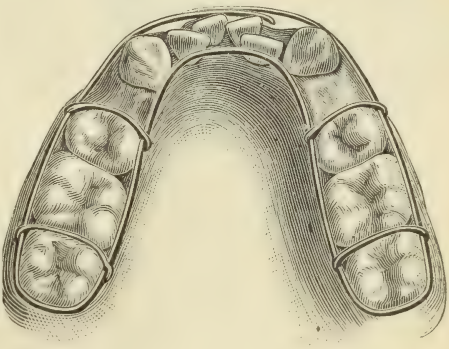
FIG. 2.—The arch can be easily expanded in many cases with a similar spring appliance. When used for that purpose, the principal or foundation spring can be arranged either on the inside or outside of the arch, as is found best suited to the individual case, although it

should in most cases have a small loop formed in the wire at the median line of the arch.

This point I referred to in a previous paper in the DENTAL COSMOS, vol. xxix, p. 373, describing a method of spreading the anterior part of the lower arch with a plate without covering the teeth. The same wire should extend back along the line of the necks of the teeth and clasp around the last one in the arch, and continue forward usually to the mesial side of the first bicuspid, and there extend over the grinding-surface and be soldered to the original wire, which will keep the appliance from pressing on the gum, and also clasp the teeth firmly. The opening of the median line loop from time to time will spread the bicuspid portion of the arch. The incisors can often at the same time be moved outward into line by the foundation-spring, by opening the loop and shaping the spring to press against them. For this purpose the spring should not be too stiff.

One or more additional loops of wire may pass over the grinding-surface at the junction of two teeth and be united to those on either side, if the appliance is not otherwise well retained.

FIG. 3.



This device for attaching apparatus to the teeth I have termed a "crib," a more minute description of which will be given farther on.

FIG. 3.—An effectual method of drawing too prominent or overcrowded lower teeth into proper line (as well as those of the upper arch) where a bicuspid has been removed on either side, leaving a space, is to arrange a spring wire on the lingual side of the teeth in the line they should assume when regulated. The wire should extend back, following the outline of the gum, and again forward on the labial side, forming a crib as described, except that the ends should be left free to form springs, which extend forward on the labial side of the teeth, beyond the median line, thus passing each other. By the inward pressure of the springs the teeth are forced against the main wire and thus drawn into proper line. It is remarkable that the pinching pressure exerted on the teeth embraced between the inner and outer spring wires squeezes the teeth also to the right and left as if they were being directly pushed backward along the curved inclosure of the crib, which thus simultaneously compels and controls the movements of the teeth in the desired directions.

If the front teeth are not prominent enough, as seen in Fig. 4, the appliance should be made the same as the one last described, except that the main wire should be arranged on the labial side of the teeth and the springs on the lingual side, to press the teeth out into the circle made by the main wire in front of them.

FIG. 4.

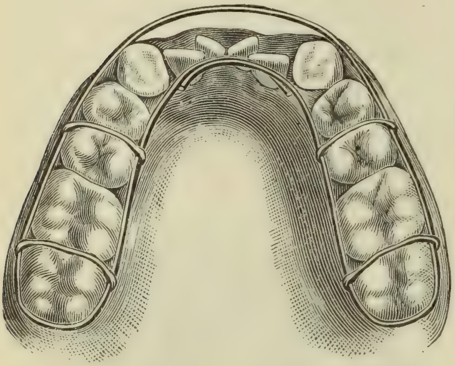


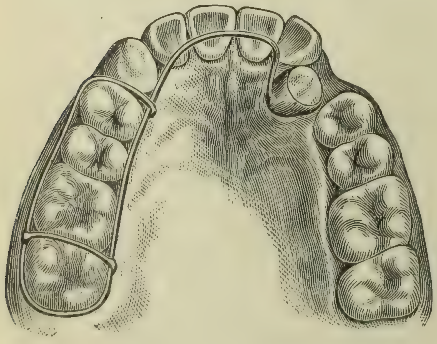
FIG. 5.—A "crib" for one side of the arch, with a spring wire passing across to the opposite side, provided with a partial clasp fitted to the tooth to be moved and soldered to the wire end, is efficient in some cases for pressing into line a cuspid or other tooth that is inside of the arch.

A similar crib can also be arranged on either side of the arch and the two be joined by a small spring wire, to which can be attached a T-piece to draw back prominent incisors, as in the V-shaped arch, and at the same time spread the anterior part of the arch by having the spring press against the lingual side of the teeth that are to be moved outward.

I now present the model of the teeth of a lady thirty-six years old, all of whose upper front teeth closed inside the lower ones.

It will be seen that one lateral incisor and bicuspid and three molars are missing, some of them having been extracted years ago with the hope of correcting the irregularity; but the teeth had crowded together, and the articulation became so changed as to give an unpleasant expression to the features. Besides this, the labial surfaces of the superior incisors were becoming worn.

FIG. 5.



The second model was made from an impression taken while the apparatus was in the mouth, and shows the method adopted for forcing the teeth forward.

The difficulty that is often experienced of moving nearly all of the oral teeth in one direction was very marked in this case, as will be seen by the models.

A crib was made for each side of the arch, to encircle all of the teeth back of the incisors; a slight separation was made by wedging in front of the cuspids, and a round iridio-platinum wire was flattened to pass into the space on either side, and extended back following the line of the gum and surrounding the cuspid, bicuspids, and molars. This was supported and made to more firmly clasp the teeth by making cross-bars to connect the two sides of the crib by passing over the articulating surface at the junction of the teeth, serving also to keep the crib from pressing on the gum.

There was a loop soldered to the crib-wire opposite the palatal surface of the first molar on each side of the arch, into which loop was hooked the end of a piano-wire formed like the letter S, and extended forward, passing just back of and following the curve of the incisors. There were placed on the incisors gold collars with lugs soldered on their palatal surfaces, to hold that portion of the spring in position.

FIG. 6.

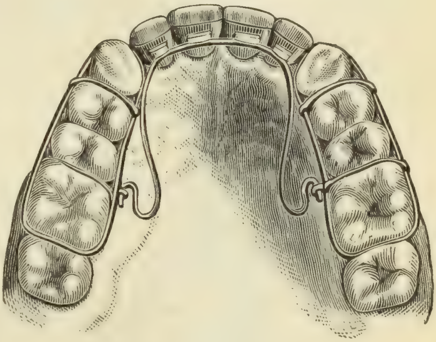


FIG. 6 shows the device in place on the four incisors in another completed case of the same character.

Pressure was made as needed, by straightening the S loops of the spring wire a little at a time.

The incisors were moved rapidly, and when sufficiently forward the portion of the crib in front of the cuspids was removed, and a piece of piano-wire was soldered to the original spring wire, which extended to the distal sides of the cuspids, by the application of which they also were moved forward. Another spring was then attached by solder to the original one, as before, to move the bicuspids forward, and at the same time one of the cuspids was prepared to be rotated by placing on it a collar, with a cylinder soldered to its palatal surface, to hold a spring which extended to the opposite side of the arch and hooked into the loop in the crib.

FIG. 7.—A cuspid or other tooth that is inside and a central or lateral outside of the line of the normal arch may at the same time be forced into line by constructing a crib for the back teeth on the same side of the arch as the teeth to be regulated, and from this crib extending forward the ends of the spring wire to the respective labial and lingual sides of the teeth which are to be moved.

FIG. 8 shows an appliance on a model for rotating a tooth. It is made like a crib, with the main wire following the outline of the gum as before described, and the ends left free to act as a spring on the labial and lingual surface of the tooth to be rotated, on which is placed a collar having slight depressions or sockets to receive the ends of the springs, which are curved to proper form to cause pressure in the desired direction, and conform to the surface of the gums. The appliance is easily made, can be used for any tooth, and does rapid work. The wide range of the action of these arms is peculiarly noticeable, for by them every conceivable direction may be given to the tooth according as one, or the other, or both of the arms shall be adjustably bent for action.

In uniting piano-wires to form the crib, the joints are strengthened by first drawing the temper of the end of the wire, and flattening it very thin with the hammer, again drawing the temper and bending it around the main wire before soldering. If great strength is needed, very thin copper wire should be wound about the joint before soldering. It is always well to make the parts bright and tin them before uniting, if soft solder is to be used. Use at all times a very weak solution of muriate of zinc, and preferably employ the soldering iron. Collars are indispensable in many cases for holding the ends of the spring in position on the teeth.

FIG. 7.

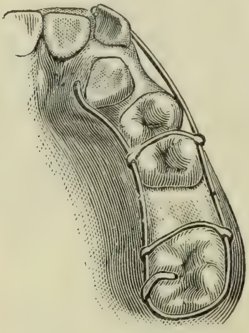
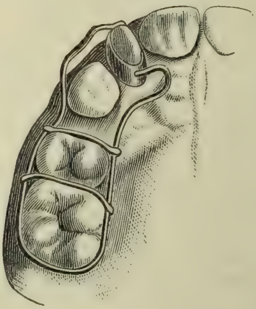


FIG. 8.

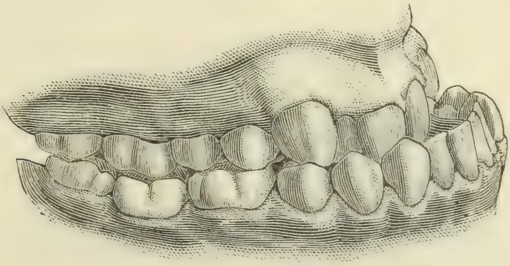


For the ordinary case a lug may project from the collar, but for special rotating purposes a socket is made usually by soldering to the collar a loop of small platinum wire in suitable position to receive the end of the rotating spring.

If the crib is not well retained by the devices previously described, a separation should be made by wedging, to allow a cross-wire to pass between the teeth to connect the sides of the crib; or a spring can extend from the crib to clasp a tooth in the same manner as for retaining a plate, or collars with slight ridges on their surfaces can be used as previously described.

I now present models and apparatus illustrating a procedure that proved efficient in correcting the position of the teeth in both the upper and lower maxillæ for a patient twenty-two years of age. The distance from the lingual surface of the right superior lateral to the labial surface of the right inferior cuspid when the teeth were articulated measured about three-fourths of an inch (Fig. 9).

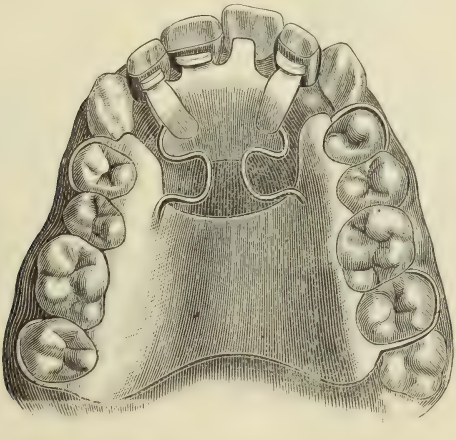
FIG. 9.



The superior maxilla was not, however, well developed, and the incisors needed to be made more prominent to assist in improving the outline of the features.

A split plate (Fig. 10) was made as described by Dr. W. H. Coffin, of England, except that it did not cover the teeth or open the bite.

FIG. 10.



It was strongly retained by two wire clasps extending from either side to clasp a bicuspid and molar. The plate was divided laterally, leaving the anterior part sufficiently large to cover the intermaxillary portion of the process for the purpose of forcing it forward with the teeth. Collars of gold, with lugs on their lingual surfaces, were placed on the incisors, and firmly retained the anterior part of the plate.

When the incisors were moved as far forward as practicable (Fig. 11, which shows the case after six months), the appliance shown in Fig. 12 was made and adjusted, as seen in Fig. 13.

This metal appliance was made of brass to cover the chin, and provided with two perpendicular tubes soldered on the outer surface, and corresponding in position with the corners of the mouth. A crib was made of German silver wire, for the lower incisors and bicuspids, with the main wire on the labial surface and extending back, following the outline of the gum, to surround the bicuspids, with the wire ends left long to act as springs on the lingual surface of the incisors. The cross-bars to connect the sides of the crib extended over the grinding-surface at the junction of the bicuspids on either side. The inferior first molars were at the outset pulpless, and were subsequently extracted. Wire posts were soldered to the main wire, and curved in suitable form to allow room for the action of the lower lip and to enter the tubes in the chin appliance at the proper angle. Two German silver wires were pivoted to the lower part of the chin apparatus, with the ends projecting upward and backward sufficiently far and diverging until they were about one and one-half inches apart. The ends were then bent at sharp angles and united with solder. A metal button

FIG. 11.

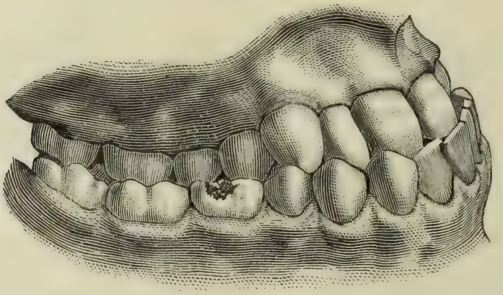
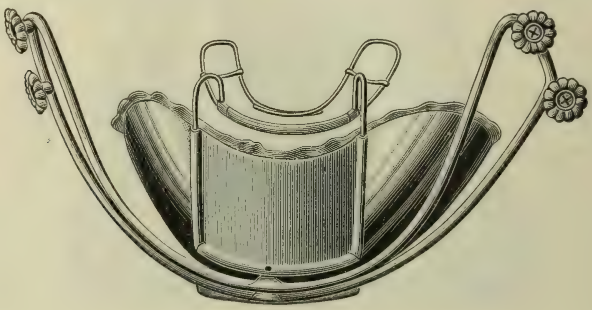
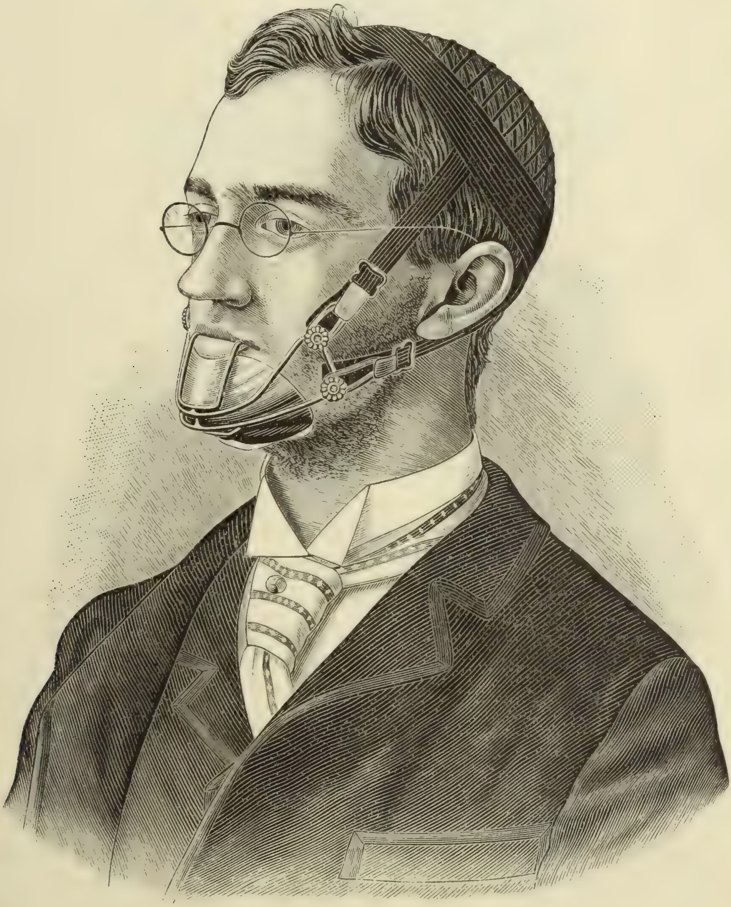


FIG. 12.



was soldered to each of these angles for the attachment of rubber bands, to exert the traction on the appliance. It is obvious that properly directed traction on the chin-piece would force the crib backward, carrying all the inclosed lower incisors, cuspids, and bicuspids toward the second molars, which were finally almost touched by the bicuspids. It will be noticed that the arch of the inferior oral teeth was maintained by the crib while in transit, and that the molars were in nowise disturbed. There is great advantage in having the wire portion pivoted to the appliance, as it acts like a whiffletree, and thus the appliance is not drawn sideways at each change of the tension. The part passing over the head was made of strong cord net-work, with a border of silk ribbon about one inch wide, to which were attached two non-elastic suspenders with buckles on either side. The buckles were

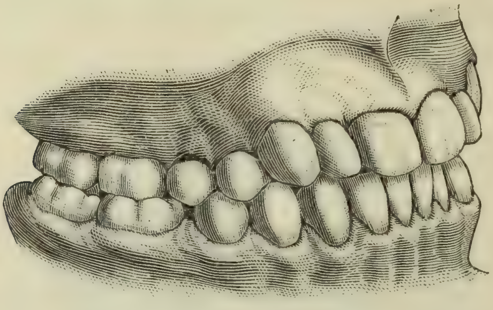
FIG. 13.



provided with wire hooks, which were concealed by a flat piece of metal to receive the rubber bands.

The resulting improvement in the relations of the teeth is shown in Fig. 14, the impression for which illustration was taken six months after the application of the chin and crib apparatus.

FIG. 14.



THE OBTUNDING OF SENSITIVE DENTINE.

BY SAMUEL A. MILTON, D.D.S., CLINTON, MO.

MORE than two years ago it occurred to me that by introducing the vapor of oil of cloves into a tooth-cavity I could obtund the sensitiveness of the dentine. A patient with sensitive teeth gave an opportunity for the following experiment. I opened the valve in my hot-air syringe, introduced some oil of cloves, and by placing the syringe over an annealing lamp vaporized the oil. I then blew the vapor into the cavity that was being prepared for filling. The result was both gratifying and satisfactory, with the exception that the cavity was oiled. I removed the oil with a little alcohol. An apparatus by which any desired medicament could be vaporized and thrown into a cavity at a desired temperature without condensation on the surface became at once a desideratum. In the experiments which followed, such remarkable successes resulted that a thorough study of the principles involved was entered upon. In nearly all recent discussions and suggestions relating to the obtunding of sensitive dentine, the two principles of refrigeration and hydration have been mainly considered. Both of these include a degree of the element of applied force, and both include the idea of taking something out of the tooth,—heat in one case, by rapidly lowering the temperature through the application of a volatile agent; the other, the removal of moisture.

Radically different is the proposed method of forcing something into the tooth-structure, as by the introduction of highly rarefied obtunding or anesthetizing vapors. Absorption of these vapors takes place, producing a local anesthesia.

Any medicament placed in a tooth, for any purpose, is put there in expectation of its absorption ; for if no absorption takes place dry cotton would be of as much value as if saturated with a medicament, except the agent be a coagulant or an escharotic acting by sealing up the tubuli. The obtunded condition of dentine is usually brought about by depriving the parts either of warmth or moisture, or of both, by the methods referred to. This condition differs widely from this method of inducing absorption. The abstraction of heat is absolutely avoided, and a partial abstraction of moisture is only effected as a preliminary step to make room for the medicament. As clinical experience shows an obtunding of the dentine to a certain depth, it is a reasonable conclusion that the substance of the dentine has been mechanically charged with the agent employed by reason of the vaporized condition of the medicaments, supplemented by the force used in throwing it into the cavity. The vapors thrown into the cavity under treatment should be as nearly at the temperature of the tooth as possible, as no pain is caused by the introduction at this temperature, even though the tooth be exceedingly sensitive to heat and cold. This is an important point.

Effect on Tooth-Structures.—Many dentists have adopted the plan of introducing medicated oxyphosphate in deep-seated cavities. What occurs in the use of the vapors covers the principle involved in such applications,—the peripheral tubuli and contents become thoroughly embalmed. In two years' experience no bad effects from the use of vapors have been observed. An incidental advantage is that by throwing in the vapors during the operation the tooth, the mouth where the dam is not applied, and the instruments are all placed and kept in a thoroughly antiseptic condition.

Collateral Uses.—In all cases of inflamed and aching pulps, the vapor of chloroform gives immediate relief. After the extracting of a tooth having an abscess, the same vapor blown into the socket gives immediate and permanent relief.

In cases where it is difficult to place an application for devitalizing the pulp, dilute a little carbolic acid with oil of cloves or camphophénique, and with a pledget of cotton take up the slightest trace of arsenious acid, touch the exposed point, and blow on it chloroform vapor for a few seconds, which produces prompt absorption of the devitalizing agent and quiets the tooth if aching. In removing calculus, when the gums have receded and the necks of the teeth are sensitive, the chloroform vapor so employed will in a few seconds sufficiently obtund the sensitiveness. The vapor of oil of cloves or of campho-phénique will also satisfactorily obtund in such cases. The same vapors are efficient in cases where it is necessary to grind teeth down to improve the articulation, or for cap-crowns in bridge-work. Medicated vapors are useful in drying out root-canals, and in placing them, together with the tubuli, in a thoroughly antiseptic condition. Other advantages will be so obvious to the intelligent practitioner that further detail is unnecessary.

It is believed that therapeutic agents introduced as described will save more pulps than by the methods commonly practiced.

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PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

(Concluded from page 792.)

SECOND DAY—*Evening Session* (Continued).

DR. J. A. SWASEY, Chicago, wished to draw the attention of the association for a moment to the subject of inlays. Dr. Harlan has spoken of rubber inlays. They look very nice when well done, but the only one the speaker had ever seen where the edges stood up right was made of black rubber. The white rubber wears out too rapidly. The inlay which he himself uses he makes of gold. Formerly he took an impression of the cavity in modelling composition, from which he made a model, and then proceeded to make a die and counter-die; but lately he had been lessening the labor by taking the impression with a ribbon of gold, No. 120, which, after assuring an accurate fit, was placed in coal-ashes and plaster and filled in with gold fused carefully to it. The inlay is fixed in the teeth with creamy oxyphosphate; after it has set, the inlay is finished off, and if the work is well done it cannot be told from a gold filling.

Dr. P. T. Smith. Dentists know from experience that one of the most difficult things they have to do is to preserve the nerves of the tooth-pulp where caries has set in but has not yet reached the pulp-chamber. He had been taught that if the cavity of decay did not extend too close to the chamber, proper filling might preserve the pulp in a healthy condition. So far as practical experience goes, this seems all right, but the idea did not suit him exactly. We know the radiation of the tubules from this locality, and what they are filled with—a fluid which performs the function of nerve-fiber, which is an organic structure. It is no matter if it is not a complete organism; it performs the duties of an organism. Wherever decay occurs, there is found destruction of these tubuli and their contents, and that is a threatening danger to the perpetuity of that pulp. If the tubuli could be cut out without disease, the life of the pulp would be endangered. Just as too close pruning of a tree will injure or even kill it, so the destruction of the tubuli and their contents, from whatever cause, will work injury to the pulp. The idea of talking about saving pulps which are exposed is not sound, according to his opinion. To do that the harmony of the parts must be preserved, which is impossible unless the tooth can be preserved intact. The entire nervous system is the brain system, and no part of it can be destroyed without injury to the whole. His experiments and his hopes have been to the end of saving pulps, but he cannot do it, and he never now undertakes it unless the cavity of decay is very far removed from the pulp-chamber.

Dr. Goddard. Implantation is sometimes a proper operation to perform. His method is to prepare teeth for implantation by taking a root to suit the case—it is easy to find a root to suit almost any required operation—and attaching to it a Logan crown. He then cuts a groove around it and fills with gold, making a perfect joint at the gum-margin, so that decay cannot commence at that point.

Dr. Crouse has been capping pulps for twenty years, and he has a record of every case, but his experience is not like that of the two gentlemen who have said they fail to preserve the pulps. Some have enough satisfaction in the pursuance of this practice to keep it up through life ; others get no results. In his own practice pulp-capping has been satisfactory for twenty years. He had agreed at the meeting of the Section to take charge of the subject of pulp-capping for next year, and he wished all the members to make a note of their experience in that direction for him, in order that a comprehensive and useful report may be made.

Dr. Storey. "Dr. Crouse lives in Chicago ; I live in Texas. He can save pulps in Chicago that he couldn't save in Texas. I kill them all, when they are exposed ; there is a funeral three or four times a week in my office. When I capped pulps, I simply made trouble for myself and for the other fellow, and I long since abandoned the practice."

Dr. Crawford. In the methods of treating dental pulps which have been spoken of here, the leaving out of one factor which to his mind was of the first importance has been conspicuous. Nothing has been said in the discussion with reference to differential diagnosis. There appear to be two extremes : One party would devitalize all open pulps, the other would attempt to save all. He occupied the medium ground. His practice was based on careful observation of each case, and his experience was decidedly that he never saved a pulp after a considerable portion of the interzonal layer was disorganized. The pulp was not in condition to be permanently restored after the interzonal layer was obliterated. Nervous reflex plays an important part in these conditions; but the only thing he wished to call special attention to was that he deemed it useless to attempt to preserve the pulp after it had been exposed long enough to impair the vitality of the interzonal layer, that part which should be sensitive. In such cases he proceeded to treat as his friend from Texas did. In the other class, he undertook to preserve as Dr. Crouse did, and if not successful, as sometimes occurred, he had a most perfect condition for root-filling.

Dr. A. E. Baldwin, Chicago. In a general sense, in the treatment of any physical ailment not only climatic surroundings but the physical condition of the person must be taken into consideration. So in treating pulps, not only the person but the tooth itself must be taken into the account. The treatment of pulps had been a very interesting study to him for years. Any of us may make mistakes in treating these cases. He has seen teeth where a nearly-exposed pulp had been capped and filled with oxyphosphate, and the pulp had died painlessly and the tooth remained useful for years. Some such teeth were sensitive to heat and cold when the pulp was dead, a fact which he explained by supposing it due to the changed current of nutrition causing excessive sensitiveness of the pericemental part of the tooth. Often a young, robust man would present with a painful tooth, and from these he should hope for better results than from the same sort of a tooth in one who was infirm or of tuberculous diathesis, or one from any cause lacking the elements of healthy manhood. He does not think it wise, unless there is reason from the condition of the patient to expect a high vitality, to attempt to save exposed pulps. There is considerable ambiguity in the use of this term. When he speaks of an exposed pulp, he means one which is actually exposed. A pulp which cannot be got to without removing tissue is not exposed. Dr. Crouse is exceptionally successful in the treatment of these cases; so is Dr. Brown; but in the speaker's own practice, if pulpitis has existed for any length of time, he finds it better to devitalize, clean, and fill the root.

Dr. Rhein. One point has not been touched upon in the discussion, namely, the advisability, in patients who have not reached the age where the tooth is thoroughly matured, of saving the pulps, even when fully exposed, as long as possible. Whether it is eventually retained or lost, every day it is retained in such cases is so much gain.

Dr. Conrad deemed it proper to attempt the capping of all pulps in young subjects, and it was a question in his mind whether the attempt had better not stop at a certain age. He believed with Dr. Storey that climatic conditions had much to do with success or failure. But when they advise the use of oxychloride of zinc to induce a deposit of secondary dentine, they ought to be met with the reply of the eminent gentleman who says arsenic might as well be applied to the pulp in the hope of restoring it. He rarely attempts pulp-capping in persons who have arrived at middle age, but he would do it every time in a young person, though he would never use an irritant.

On motion of Dr. A. O. Hunt, the secretary was instructed to telegraph greetings and congratulations to the International Medical Congress, now in session at Berlin, Germany.

Adjourned to 9.30 A.M. to-morrow.

THIRD DAY—*Morning Session.*

The association met at 10 o'clock, President Foster in the chair.

On motion of Dr. Crouse, the election of officers and the selection of the next place of meeting were made the special order for the evening, at 7.30 o'clock.

Section IV, Histology and Microscopy, was called, and Dr. W. X. Sudduth, the secretary, stated that the Section would have two papers, illustrated by lantern exhibits; the first by Dr. A. O. Hunt, Iowa City, Ia., on the "Blood-Supply of the Teeth," and the second by Dr. W. X. Sudduth, Minneapolis, Minn., on "Tumors." Dr. Sudduth complained that the time allotted for showing these lantern exhibits at a previous session was insufficient to allow of their proper presentation.

After discussion, on motion of Dr. Crawford, the previous action was reconsidered and the Section was given all the time necessary.

The Section was then passed temporarily, and Section V, Materia Medica and Therapeutics, was called.

Dr. A. W. Harlan, Chicago, chairman, announced that the Section had one paper to report, by its chairman.

Dr. Harlan then read his paper, which was upon Carbolic Acid. The history of carbolic acid, from its first discovery by Runge in 1834, was succinctly told by means of chronologically-arranged quotations from the authors who have from time to time promulgated new facts with regard to it as they were recognized. Among the writers and authorities drawn upon were Garrod, who described the preparation, properties, and uses of carbolic acid in 1864; Fownes (1868); "National Dispensatory," in which it was stated that absolutely pure carbolic acid was obtained by Church in 1871 from the nearly pure commercial product; Farquharson, Mitchell, Wood, and Bloxam, the description of the last-named being characterized in the paper as the "most complete account of the composition and properties of carbolic acid extant."

Within the year synthetic carbolic acid (a sample of which was passed around) had been produced. Hitherto all carbolic acid used in medicine had been prepared from coal-tar, but it was never absolutely pure, the best proof of which was found in the melting-point 35°–37°

C. (95° to 98.6° F.), the very best in the market melting at 39.5° C. (103° F.). Pure carbolic acid melted at 41°–42° C. (106°–107° F.), which was the exact melting-point of the synthetically prepared article. It boiled at 178° C. (352.4° F.), which was also the boiling-point of pure phénol. This temperature rose to 181° C. when the whole thermometer was surrounded by the vapor of the boiling acid. The synthetic carbolic acid was absolutely anhydrous and colorless, and was soluble in twelve parts of water to an absolutely clear liquid. The most characteristic difference between it and the acid prepared from coal-tar was found in the faint "pure odor" of the former, not in the least recalling that of coal-tar; a five per cent. solution was odorless. The exact method by which it was prepared had not been made known, but it was supposed that it was produced during the process of sulphonizing benzol and subsequent fusion of the benzol-sulphonate with caustic alkali. The synthetic acid sold at Dresden, Germany, at 4.60 marks per kilo, while the pure redistilled coal-tar product was quoted at 4.10 marks. Tested by the Imperial German Health Department the synthetic carbolic acid was found to correspond to all the requirements of the "Pharmacopœia Germanica," except that it gave a faintly acid reaction with blue litmus-paper; and it was found to diminish the life-action of bacteria rather less than the older kind, but the difference was so small that the two kinds might be considered to be practically of the same value. One of the decided advantages of the synthetic product was its greater solubility in water.

Passing to a consideration of the extensive use of carbolic acid in dentistry, the writer proceeded to point out the reasons for its abandonment in certain lines of practice. *First.* A pulp to which a paste of arsenious acid, carbolic acid, and acetate of morphia had been applied would very soon begin to putrefy if exposed to the ingress of saliva, even though tolerably well sealed with sandarac, cotton, or other plug. Oil of cloves, oil of cassia, or oil of cinnamon should be used instead of the carbolic acid in pulp-destruction. They retarded the action of the arsenic, but when a pulp had been deprived of vitality decomposition did not supervene. *Second.* Carbolic acid was unreliable as a root-canal dressing because of its solubility in water. It also coagulated the surface of the animal matrix of the tooth, rendering it necessary to cut away the surface before filling the root, if the color of the tooth was to be preserved; and it was self-limiting in hard structures and not diffusible. *Third.* It was not a chemical disinfectant in the presence of sulphuretted or phosphuretted hydrogen, merely masking instead of destroying the odors. *Fourth.* Its lack of diffusibility prevented the destruction of absorbed ptomaïnes or septic matter and gases in the dentine of pulpless teeth, and it was positively useless in blind abscesses, except to convert them into the acute form. *Fifth.*

It might be discarded as a stimulant around the roots of teeth, unless used in combination with a camphor, glycerine, tannin, or an oil to remove its causticity, which was always preserved by water. *Sixth.* When applied to an exposed pulp, its effect was only transitory. In case of suppuration the carbolic acid would arrest it for the moment, but in a few hours its influence would be lost and the pulp would be irretrievably lost in most cases. In a fresh exposure there was no need for the forming of an eschar, which in no way simulated nature's covering. It was an irritant escharotic and destructive. Better arrest the hemorrhage with an astringent, and apply a non-irritant over the pulp, than to risk the direct application of carbolic acid. *Seventh.* It was valueless for injection through fine roots not entirely free from fragments of pulp-tissue, to reach an abscess with fistulous opening, because it did not preserve pulp-tissue, no matter how well filled the root and crown might be. It was a mistake to suppose that an agent like carbolic acid, liquefied or diluted with water, would prove a permanent antiseptic in the presence of moisture such as was always found in a tooth ; it did not embalm, because it was absorbed and disappeared.

Carbolic acid should form no part of a root-filling, nor should it be used to saturate cotton or silk to be introduced into roots permanently. Copal, dammar, Canada balsam, and other agents of that class may be used on exposed pulps in its stead. For injection of abscesses through the root-canal, potassium permanganate, silico-fluoride of sodium, solution boroglycerine, the oils of cloves, cassia, and cinnamon, and agents of that class were more powerful with better stimulating, antiseptic, and disinfectant properties, without the coagulant power or disagreeable odor of carbolic acid ; nor did they clog a delicate canal or destroy the soft tissue.

Dr. Harlan's conclusion was that the legitimate place of carbolic acid in dental practice was as a spray, as a local anesthetic, as a component of mouth-washes, as an adjuvant to the oils for local medication around the roots of teeth, or for injection into the antrum of Highmore ; or, it should be relegated to the laboratory as a component of sodium phenate or for other chemical uses to which it was so admirably adapted.

Section V was passed, and Section VI, Physiology and Etiology, was called.

Dr. H. A. Smith, Cincinnati, chairman, read the report, in which it was stated that the Section, in endeavoring to carry out the instruction of the association last year relative to the examination and tabulation of pre-historic crania, found that considerable preliminary work was necessary before the task could be proceeded with. A scheme for the tabulation had been devised, the application of which was shown in the accompanying form :

Cranial Examination Record: Section VI, American Dental Association.

Serial No. 15.

Academy of Natural Sciences Museum, Philadelphia, July, 1890.

Museum. Number. 0000. Race.	Age.	Sex.	Facial Angle.	SUPERIOR MAXILLARY.						INFERIOR MAXILLARY.					
				3, to **,3**	**7,** to **,7**	M.Al.Point to **7,** & **,7**	M.Al.Point to S. Process.	Height of Vault at **7,** & **,7**	Antra. Right. Left.	$\overline{3,}$ to $\overline{,3}$	$\overline{7,}$ to $\overline{,7}$	M.Al.Point to $\overline{7,}$ & $\overline{,7}$	Al. Point to Condyle.	Condyle to Condyle.	Ramus Angle.
Illinois M. B. Alexander Co.	45.	M.	78°	$1\frac{1}{16}$	$1\frac{11}{16}$	$2\frac{1}{16}$	$2\frac{7}{16}$	$\frac{25}{32}$	0″,O om br 6,	$\frac{13}{16}$	$1\frac{10}{16}$	2	$4\frac{9}{16}$	$4\frac{7}{16}$	132°

Indicating Letters and Signs to be marked *above* the Superior Symbols and *below* the Inferior Symbols.

a : Abscess.
b : Buccal.
c : Coronal.
d : Distal.
E : Erupting.
e : Eroded.
f : Fissure.
i : Irregular.
l : Labial.
ll : Lingual.
m : Mesial.
mg : Missing.

n : Neck.
o : Opening.
p : Palatal.
pu : Pulpless.
py : Pyorrhea.
r : Root.
s : Supernumerary.
sy : Syphilitic.
T : Toothless.
t : Tartar.
v : Vacancy.
w : Worn.

× : Extracted.
O : Normal size.
⬭ : Wide & short.
0 : Narrow & long.
| : Cusped.
+ : Bicusped.
△ : Tricusped.
□ : Quadricusped.
⌂ : Quinquecusped.
′ : Small
″ : Large
‴ : Very Large } Cavity or Size.

3, to **,3** means center to center of palatal (or lingual) borders of alveoli; **7,** to **,7** means ditto. The vault height from level of the alveolar points between **7** and **8**. Condyles measured from out to out. Median alveolar point to **7,** & **,7** or $\overline{7,}$ & $\overline{,7}$ means to the alveolar points between **7** & **8** respectively.

REMARKS.

This Record is fictitious, except the measurements, which are precisely those of a cranium containing thirty-two teeth, not one of them carious. The indices are placed with a view to their own exemplification rather than to the illustration of typical tooth relations, forms, or abnormalities. The diagrams* are merely aids to an initial understanding of the Hillischer Notation and Indices. With these clearly in mind, a complete record can be quickly made and supplemented by a few remarks to fully exhibit all the dental and related aspects of the cranium under observation.

(*The "diagrams" referred to represent the external surfaces of the thirty-two teeth, and are here omitted as not essential to the record. —Ed. DENTAL COSMOS.)

⌂′ nb′.	□″ c″.	△‴ d′ : c‴.	e′nb.	e″nb″.	il.	ill.	m″.	m″.	p′.	0| sp.	⬭+ il.	e″nb.	e″b″.	△″ c″ : bf′.	□‴ abo. c‴pu.	⌂′ fp′.
8,	**7,**	**6,**	**5,**	**4,**	**3,**	**2,**	**1,**	**,1**	**,2**	**,2**	**,3**	**,4**	**,5**	**,6**	**,7**	**,8**
8,	**7,**	**6,**	**5,**	**4,**	**3,**	**2,**	**1,**	**,1**	**,2**		**,3**	**,4**	**,5**	**,6**	**,7**	**,8**
c′ : f′b.	dc″ : m.	c‴pu. abo.	r′.	c″ : w′. llt.	w′. llt′.	w″. llt″.	w″. llt″.	w″. llt″.	w″. llt″.		w″. llt‴. dpy″,	w′. llt″. mpy′.	c′. llpy′.	m : c′ : d′. ⌂	d″. ⌂″	c″. □′

A system of dental notation seemed to be requisite. The Hillischer system had been in part employed in the scheme presented, which also included with the record of race and age the facial angle, the value of which from the dental stand-point, as well as the manner in which prognathism, etc., affected dental expression, was yet to be determined.

The report commended the work of Dr. E. G. Betty, of Cincinnati, as shown in his paper entitled "A Critical Examination of the Teeth of Several Races," etc., which appeared in the *Dental Review* for April, 1890. The Section proposed different bases of measurements from those adopted by Dr. Betty : First, the measurement from neck to neck of the cuspids between their palatal centers or the like edges of their alveoli when the teeth have been lost, in preference to the measurement between the anterior surfaces, as affording a more correct basis for determining the aspect of the anterior dental arch ; and because it has often been found that in crania from which the teeth have been lost after death, portions of the outer alveolar plate have been broken away ; and again, these tabulated data were to be compared with measurements of living subjects, casts and cuts, in which the internal surfaces were most commonly observed by the dentist and most accurately represented in casts and cuts. Measurements from the median alveolar points to the alveolar points between the second and third molars completed the data requisite for the representation of the sizes and shapes of adult dental arches ; and from the median alveolar point to the spinous process for the oral aspects of the inferior maxillary,—the height of the vault between the second molars being a single measurement. The measurement of the inferior maxillary between the median alveolar point and the distal surface of the condyle, and from outside to outside of the condyles, together with the definition of the angle of the ramus, should lead to instructive conclusions. Distinctively dental details were amply provided for, and need not be specifically referred to further than to direct attention to the importance of a critical examination of the cusped characteristics of the molars to a careful record of variations in tooth-forms.

In order to have the preliminary work as fully considered as was practicable, copies of the blank and example records and of a paper on the Hillischer system of notation prepared by the secretary, Dr. How, had been sent to the members of the Section and to some others.

Dr. Ottofy would present a continuation of his reports on the subject of implantation, and Dr. How would read his paper.

Since the opening of this meeting, Dr. J. J. R. Patrick had presented to the Section a system for the examination and tabulation of crania, which after full consultation was adopted in lieu of the one previously prepared by the committee, and Dr. Patrick was selected to take direct supervision of the work.

Dr. J. J. R. Patrick, Belleville, Ill. The enumeration of irregularities and abnormalities, if any were found, ought to accompany the tables, in the preparation of which all the help that could be obtained was wanted. Many things were to be observed in the examination of pre-historic crania, and he congratulated the association that after many years of obstruction a plan for the prosecution of the work had been adopted. One man could not reap all the honors to be gathered from this investigation : there was too much of it for any one man to accomplish it ; and, again, much of the scientific value of an investigation of this character would be lost, if it were conducted in a spirit of individualism. For this reason, several should always be present at each examination. He had been engaged in this work for twenty years ; but what it would take one man twenty years to do could be done in one year by twenty men, if they worked systematically, and we need not wait a dozen years to make a little progress. The work to be done was the observation of the points of interest to dentists found in skulls already dug up, prepared, and put up in cases. So far the work was simplified ; there was now no digging to be done, as was the case when he first engaged in the examination of pre-historic crania. [Dr. Patrick here presented a memorandum of his scheme for the work, including the points to be noted. Up to the time of going to press, a copy of the scheme has not reached us.]

The dental profession, like the medical, was indebted to the earnest work of men who from the fifteenth century onward had pursued their investigations in the anatomy and physiology of the human race. The first on the list was Eustachius, the Italian, an anatomical naturalist who risked his life in performing dissections when the laws prohibited, under pain of death, the mutilation of dead bodies. He was the first to teach his fellow-man that the teeth were developed *in utero.* Fallopius was also an eminent investigator. Malpighii all of us know of. Then came Ambrose Paré, and then John Hunter, who was the first writer on the physiology of the teeth. So careful was he in his investigations and so true were his conclusions, that none of his work has since been undone. Among others who have aided to a knowledge of the teeth may be named Fox, Geoffroy St. Hilaire, Goddard, Carabelli, and Floré.

By the earnest prosecution of this proposed investigation the dental profession would have the opportunity of returning to the surgeon and physician something in kind for what these have done for dentistry ; and he considered it to be the duty of every man who loved his profession to lend a helping hand to the work. There ought to be no jealousy in it. As he has said, twenty men could accomplish a great deal in a year, and every one of them would earn a blue ribbon. He hoped all who could would take a hand in it. What was wanted was to have the work thoroughly done and covering as many examples as possible, in order that they might have a cloud of witnesses. They would thus be able to prove or disprove many things that have been said in dental societies. It would be the means of choking down an immense amount of unfounded theory, and it might clip the wings of some soaring orators ; but that could not be helped. They would simply have to come down and walk on the earth where they were intended to.

Dr. W. Storer How, Philadelphia, read a paper entitled "The Hillischer Dental Notation, with Indices."

He said that in the DENTAL COSMOS for April, 1885, attention was editorially directed to the subject of "symbols for the graphical designation of the human teeth in their several positional relations after eruption, providing also for the record of defects in, operations on, substitutes for, or malpositions of individual teeth," with special reference to the Hillischer system, which was particularly described, and illustrative examples given.

The International Dental Congress in Paris last year nominated Drs. Grosheintz, Dubois, Schwartz, Trallero, and Cunningham a commission to consider the subject of dental notation and report.

As preliminary to what he had to offer, Dr. How read the following paper presented to the Odontological Society of Great Britain (published in the *British Journal of Dental Science* of March 15, 1890, and in the *Ohio Journal of Dental Science* for May, 1890), by Dr. George Cunningham, M.A., L.D.S., D.M.D., who reported the proceedings and the mode of notation recommended by the commission, which was unanimously adopted by the congress.

THE INTERNATIONAL DENTAL NOTATION.

At the International Dental Congress held in Paris, September, 1889, Mons. Grosheintz, of Paris, made an interesting communication entitled "Dental Stenography," and in which he suggested certain symbols which he hoped to see become international, so far as the dental profession was concerned. The main features of the communication may be briefly summarized as follows :

1. He proposed to represent the teeth by the first letter of the Latin words which are ascribed to them ; for instance, for the bicuspids he employed "B" for the first, and "b" for the second, and the same for the incisors, and so on.

2. Two lines, one horizontal and the other oblique from above or below, would serve to designate by the opening of the angle the right side or left, and by the superior or inferior position of the oblique line to which of the two jaws the tooth belongs.

3. The temporary teeth (*dents caduques*) are designated in the same way, with the addition of "c" as exponent.

4. Then by the aid of the figures 1, 2, 3, 4, placed according to the case after the denominative letter, the degree of caries is indicated.

5. The surfaces attacked by caries are also designated by letters.

6. He also suggests a series of abbreviations to designate the disease, the medicaments, and the materials employed in filling.

Mons. Dubois, of Paris, while strongly supporting the objects sought to be attained by Mons. Grosheintz, criticised very strongly his symbols, more especially those devoted to the teeth. He then explained the method which he had adopted and recommended in his book, *Aide-memoire du Chirurgien-dentiste.* This method will be explained presently.

Mons. Schwartz, in criticising the symbols suggested, said that he, too, would prefer to see the teeth designated by figures instead of by letters.

I then had an opportunity of explaining the features of a system of notation which has been employed both by others and myself with considerable success for a considerable number of years. As a part of this system I had adopted the method of numbering the teeth employed by Dr. Finley Thompson, who began numbering from the right upper third molar, and counting straight on to the same tooth on the left side, and then continuing from the lower third molar on the left side to the one of the right side, thus finishing opposite where he had commenced. This was done simply to avoid confusion, since his chart of the teeth and the respective numbers attached were already in use in this country.

Candor compelled me to freely admit that this, of all the systems of numbering, was the very worst, and that years of constant daily use of the system had failed to give me the power of at once recalling with certainty the numbers indicative of certain teeth; whereas one was able to memorize the Dubois system by five minutes' study for as many, if not fewer, consecutive days.

Mons. Trallero, of Barcelona, proposed that, since the question was one of great interest, and several different systems had been suggested, a commission be nominated to consider the subject and report thereon. This proposition having been accepted, the commission was duly nominated as follows: MM. Grosheintz, Dubois, Schwartz, Trallero, and myself.

This commission, first of all, decided that it was better to adopt a system of figures rather than one of letters to designate the various teeth. It was found that all the various systems of numbering teeth by figures might be classified into three systems:

(*a*) The system of eight.

(*b*) The system of sixteen.

(*c*) The system of thirty-two.

It was resolved that any system of numbering by thirty-two was inconvenient, confusing, and difficult to memorize; it was therefore unanimously rejected.

The system of eight was warmly advocated. It consists of four groups of eight numerals, starting from the median line, the respective teeth of the upper or lower jaw being indicated by the position of the numerals above or below the horizontal line, and their situation relative to the median line being shown by a vertical line on the median line side of the figures.

The alternative (Hillischer's) system, which substitutes a point or period for the vertical line, was also considered.

The only system of numbering by sixteen which was considered was that proposed by Mons. Dubois, which consists of employing all the *odd* numbers from one to fifteen to consecutively represent the various teeth on the *left* side of the mouth, and the *even* numbers two to sixteen to represent those on the *right*, the lower teeth being distinguished by a line drawn underneath each numeral representing a tooth in the lower jaw.

It was the unanimous opinion that the system of eight numerals was certainly the easiest to comprehend and to memorize. It was considered, however, that while the Dubois system of sixteen was slightly more difficult, it was yet sufficiently easy of comprehension, and would avoid in an ingenious manner the necessity of employing any point or vertical line before or after the numerals. It was determined, however, to adopt the principle of the horizontal line as indicating whether the teeth belonged to the upper or lower jaw, which only necessitates the use of the line above the numerals in the case of a tooth belonging to the lower jaw, since the simple numeral, without a line below it, is sufficient to indicate its being an upper tooth. It is evident that either of the systems of eight suggested necessitated three signs for each tooth, whereas this system of sixteen only requires one, the number itself, for any upper tooth, and two, the number and a dash above, for any lower tooth.

The commission then recommended the adoption of the following system of numbering the permanent teeth :

	RIGHT.								LEFT.								
Upper	16	14	12	10	8	6	4	2	1	3	5	7	9	11	13	15	Upper
Lower	$\overline{16}$	$\overline{14}$	$\overline{12}$	$\overline{10}$	$\overline{8}$	$\overline{6}$	$\overline{4}$	$\overline{2}$	$\overline{1}$	$\overline{3}$	$\overline{5}$	$\overline{7}$	$\overline{9}$	$\overline{11}$	$\overline{13}$	$\overline{15}$	Lower

With regard to the temporary teeth, it was decided not to adopt the method of numbering employed in the Hillischer and other systems, which is thus expresed from the median line 1, 2, 3, 6, 7, but simply to adopt the numbers 1 to 10 on the same principle as the permanent teeth, merely distinguishing the temporary tooth from its permanent successor by prefixing a decimal point in front of the numeral.

It is claimed by Hillischer and others that their system of numbering the temporary teeth avoids confusion by retaining the relative significance of the numerals of the permanent set. This claim is self-evident, so far as the incisors and cuspids are concerned, but not so for the temporary molars, since the gap between the numbers 3 and 6 is decidedly confusing. It was deemed, therefore, simpler and less confusing to utilize the same numbers for the deciduous molars as were employed for their successional teeth, the bicuspids, and not those of their mere namesakes.

The following system of numbering the temporary teeth was adopted :

		RIGHT.					LEFT.						
Upper	. .	.10	.8	.6	.4	.2	.1	.3	.5	.7	.9	. .	Upper
Lower	. .	$\overline{.10}$	$\overline{.8}$	$\overline{.6}$	$\overline{.4}$	$\overline{.2}$	$\overline{.1}$	$\overline{.3}$	$\overline{.5}$	$\overline{.7}$	$\overline{.9}$	. .	Lower

With regard to the symbols to indicate the surfaces of the teeth, it was decided to adopt those employed in the system of notation which I have published. The only difficulty was with regard to the symbol representing the crown or masticating surfaces. This simply arose from the difficulty in finding an equivalent which would be the same in the various languages. The term "crown," or even the mere term "coronal," it was urged, is not employed in France* to indicate the masticating surface. It was, therefore, determined to substitute "t" instead of "c" for the crown surface, as being the corresponding mnemonic contraction for triturating surface (F., *Surface triturante;* L., *Superficies triturans*). It was also determined that, since labial and buccal are only two different names descriptive of the same surface, only one symbol, viz, "l" for labial, should be employed; the same remark equally applies to the terms palatal and lingual, and therefore only one symbol, viz, "p," has been adopted. The symbol signifying cervical is a segment of a circle; by accentuating the curve the sign can be made to graphically indicate the extent to which the cervical margin of the tooth is involved.

The following symbols were therefore adopted for describing the surfaces of the teeth:

T., triturating (synonyms: crown, coronal).
M., mesial.
D., distal.
L., labial (synonym: buccal).
P., palatal (synonym: lingual).
⌣, cervical.

By means of the first five signs and their obvious combinations, such as mesio-palatal, disto-lingual, and so on, it is easy to sufficiently define even any irregularly-disposed carious cavity; *e.g.*, a cavity extending from the mesial over the crown to the distal surface is sufficiently described by the letters m, t, d. If, instead of a single compound cavity, it is desired to indicate three separate cavities on these several cavities, the use of the colon is sufficient to distinguish the difference; thus, m : t : d :. The colon is always and solely employed to define the localization and the operative terms, and so prevent confusion with any adjacent symbols.

It was further determined not to suggest any further series of abbreviations for the present, as it would be advisable to consider the various systems suggested at greater leisure than the present occasion afforded.

It was further recommended that some mnemonic system, such as that recommended by myself, was more likely to lead to satisfactory results than the system of arbitrary signs so commonly used in America.

This mode of notation, recommended by the commission, was unanimously adopted by the congress at its final session.

Despite the fact that this society, in common with other dental socities, has not hitherto devoted much attention to this subject, I think it is unnecessary to dilate upon the very obvious advantages of having some one carefully-considered system of notation accepted for common use. I trust you will agree with me in thinking that it is a matter of congratulation that the co-operate intelligence of the profession has at last been aroused to the urgency of united action in this matter, and thus made a beginning of reducing to uniformity and order the somewhat chaotic productions of the various individual intelligences which have found expression in occasional contributions to various societies and journals, not only in this country, but also in America, France, and Germany. I therefore recommend a trial of this international dental notation as being easy of acquirement, time-saving, and eminently practical. Its ultimate value will depend upon the extent to which it is adopted by the profession. Its value to the individual in keeping a record of his work, in communicating with an assistant, and in corresponding with another practitioner, is evident. But before such a society as this I would urge its value to science, if only from its help in transforming the crude, almost entirely commercial, entries of the day-book or ledger into the carefully-recorded facts of the case-book, the tabulation of which will certainly do much to remove the endless records of vague, unverifiable conclusions with which our scientific literature abounds.

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* At the time of the commission, had I remembered that Dr. Andrieu had adopted the term "*coronale*" in his *Traité de Dentisterie opératoire*, p. 353, as applicable to "la surface triturante des dents postérieures," I should not have yielded so readily to what seemed a necessary change, since a cardinal factor in the success of any system must be its freedom from any capricious changes.

Dr. How said that, in presenting for consideration a modification of the Hillischer system, it is a sufficient premise to quote the declaration of the commission that—

"It was the unanimous opinion that the system of eight numerals was certainly the easiest to comprehend and memorize."

The eight numerals are arranged and indicated as follows:

Beginning at the median line, which may be expressed by a vertical mark (but none is necessary), the permanent superior teeth of the *right* side are designated by the numerals 1 to 8 in reverse sequence, separated by half-inch spaces, and accompanied by commas put close to and on the *right* sides of the several figures.

The permanent superior teeth of the *left* side are designated by the same numerals regularly arranged and likewise spaced, but provided with commas put close to the *left* sides of the several figures. These two groups represent, collectively and singularly, the sixteen superior teeth. The sixteen inferior teeth are represented by two identically like groups, furthermore discriminated as belonging to the inferior portion of the system by being put beneath dashes. To specify any permanent tooth it is only necessary, if an upper tooth, to write its numeral and put on its *right* side a comma, or to put its comma on the *left* side, as the case may be, adding a dash to indicate a lower tooth.

The deciduous teeth are represented by the proper numerals, with semicolons instead of commas to indicate the respective sides of the median line. The deciduous molars are represented by the numerals 7 and 8, because they are first and second molars of the deciduous set, and no confusion need arise if the mind be free from the error of classing them with their successors, the bicuspids.

In the following graphical expression of the scheme as thus far described, it is to be noted that the dashes have no relation to the superior teeth, which are clearly and sufficiently designated by the mere numerals; and this is made more obvious by showing first the generic formula for the teeth of the maxilla, each numeral being separated from the other by a hyphen, and each hyphened numeral representing the four teeth of its class.

Permanent generic formula, thirty-two teeth:

– 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 –

Then follows the distinctive superior formula wherein the upper teeth of both sides are denoted by mere spaced numerals, sixteen teeth.

Dual permanent superior formula, sixteen teeth:

1 2 3 4 5 6 7 8

The dual permanent inferior formula is expressed by the merely spaced numerals under dashes, sixteen teeth.

Dual permanent inferior formula, sixteen teeth:

$$\overline{1}\quad \overline{2}\quad \overline{3}\quad \overline{4}\quad \overline{5}\quad \overline{6}\quad \overline{7}\quad \overline{8}$$

The specific permanent superior formula now takes shape by the affixing and the prefixing of the indicating commas.

Permanent superior formula, sixteen teeth:

8, 7, 6, 5, 4, 3, 2, 1, ,1 ,2 ,3 ,4 ,5 ,6 ,7 ,8

Every superior tooth is thus individualized so that it may be identified in character and location whenever its symbol is written or spoken.

Permanent inferior formula, sixteen teeth:

$$\overline{8,}\quad \overline{7,}\quad \overline{6,}\quad \overline{5,}\quad \overline{4,}\quad \overline{3,}\quad \overline{2,}\quad \overline{1,}\qquad \overline{,1}\quad \overline{,2}\quad \overline{,3}\quad \overline{,4}\quad \overline{,5}\quad \overline{,6}\quad \overline{,7}\quad \overline{,8}$$

Here the same symbols put under dashes designate the several inferior teeth. For example, $\overline{,5}$ symbolizes the inferior left second bicuspid, and will be read as *dash*, *comma*, *five*. ,5 symbolizes the superior left second bicuspid, and will be read as *comma*, *five*.

The several formulas for the deciduous teeth are expressed as follows:

Generic deciduous formula, twenty teeth:

o 1 o 2 o 3 o 6 o 7 o

Dual deciduous superior formula, ten teeth:

: 1 : 2 : 3 : 6 : 7 :

Dual deciduous inferior formula, ten teeth:

$$:\ \overline{1}\ :\ \overline{2}\ :\ \overline{3}\ :\ \overline{6}\ :\ \overline{7}\ :$$

Deciduous superior formula, ten teeth:

7; 6; 3; 2; 1; ;1 ;2 ;3 ;6 ;7

Deciduous inferior formula, ten teeth :

$$\overline{7;}\quad \overline{6;}\quad \overline{3;}\quad \overline{2;}\quad \overline{1;}\qquad \overline{;1}\quad \overline{;2}\quad \overline{;3}\quad \overline{;6}\quad \overline{;7}$$

These formulas provide for every form of expression necessary for the specific description of the human deciduous and permanent teeth in whatever distinctively normal relation and grammatical situation it may be requisite to write or speak of all or each of them *in situ.*

Dr. How submitted the following suggestively as suitable abbreviations for the supplemental description and indication of dental abnormalities, their correction, substitution, or repair :

A :	Artificial.	M :	Amalgam.	v :	Vacancy.	
a :	Abscess.	m :	Mesial.	W :	Wired.	
B :	Bridge.	mg :	Missing.	w :	Worn.	
b :	Buccal.	N :	Necrosed.	X :	Exostosed.	
C :	Crown.	n :	Neck.	x :	Extracted.	
c :	Coronal.	O :	Oxychloride.	Z :	Zylonite.	
D :	Denture.	o :	Opening.	z :	Zinc Phosphate.	
d :	Distal.	P :	Pivoted.	O :	Normal size.	
E :	Erupting.	p :	Palatal.	⬭ :	Wide and short.	
e :	Eroded.	pu :	Pulpless.	0 :	Narrow and long.	
F :	Filled.	py :	Pyorrhea.	| :	Cusped.	
f :	Fissure.	R :	Replanted.	+ :	Bicusped.	
G :	Gold.	r :	Root.	\ :	Tricusped.	
ga :	Gutta-percha.	S :	Scorbutic.	] :	Quadricusped.	
I :	Implanted.	s :	Supernumerary.	⌂ :	Quinquecusped.	
i :	Irregular.	sy :	Syphilitic.	′ :	Small.	Cavity, degree, or size.
L :	Lost.	T :	Toothless.	″ :	Large.	
l :	Labial.	t :	Tartar.	‴ :	Very large.	
ll :	Lingual.	V :	Vulcanite.			

Capital letters were suggested as indicative abbreviations for words less frequently used than those represented by lower-case letters, and care was taken that grouped abbreviations should not in practice prove confusing by use as letters which might have differing significations when associated than when used singly.

Caries is to be considered as present whenever a suitable positional index is used without a qualifying index or indices, and when the symbol of a single tooth is employed the indices may follow the symbol, as 7, d:c:m, which signifies that the superior right second molar has carious cavities in its distal, coronal, and mesial surfaces ; but if these cavities were confluent, the colons would be omitted and the expression be 7, d c m. If in an inferior left second molar the distal and coronal cavities were confluent, and the mesial cavity was separate but extended into the tooth-neck, the expression would be $\overline{,7}$ nm:cd.

The following examples were used to illustrate some of the practical applications of the symbols in each of their several groups, associated with exponents from the series of indices :

–6– The four permanent first molars ; and it is mnemonically helpful to note the coincidence that these are the molars of the sixth year.

3 The two superior permanent cuspids.

$\overline{4}$ The two inferior permanent first bicuspids.

∘6∘ The four deciduous first molars.

:7: The two superior deciduous second molars.

$\overline{:2:}$ The two inferior deciduous laterals.

d: c: FG
6, The superior permanent right first molar, distal and coronal cavities filled with gold.

dcm: FM
$\overline{,7}$ The inferior permanent left second molar, confluent distal coronal mesial cavity filled with amalgam.

I
4, The superior permanent right first bicuspid implanted.

ACP
,3 The superior permanent left cuspid, artificial crown pivoted.

L E
6; 4, The deciduous superior right first molar lost, and the permanent first bicuspid erupting.

cFga
;6 The deciduous superior left first molar, coronal cavity filled with gutta-percha.

fFG
,5 The permanent superior left second bicuspid, fissure-cavity filled with gold.

A A A A A A A A A CGz. Pz. Pz. CG. CGz.
6, 5, 4, 2, 1, ,1 ,2 ,5 ,6 BDG. 7, 3, ,3 ,4 ,7 The artificial superior right first molar, second and first bicuspids, lateral, central, left central, lateral, second bicuspid, and first molar bridge denture of gold fixed on the right second molar gold crowned, the cuspid pivoted, the left cuspid pivoted, and the second molar gold crowned ; all secured by means of oxyphosphate cement.

The common marks ′, ″, and ‴ would quite clearly indicate either the presence and relative sizes of cavities, the relative sizes of sound teeth and parts of teeth, or the degrees of their departures from normal characters, conditions, or their aberrations. Other signs would express the fact of variation from or accordance with typal form in cusped teeth, as in the subjoined illustrations :

△′ □ □″
c′. d′:cf′. d″:c″:m′. CLr. O.v′. ″. s′0′p. ⊖. ‴+:f′np.
8, 7, 6, 5, 4, 3, 2, 2, 1,

We have here described the permanent superior right third molar of small size, tricusped in character, and having a small coronal cavity ; the quadricusped normal-sized second molar, small distal cavity, and small coronal fissure-cavity ; the first molar large quadricusped, large distal cavity, large coronal cavity, and small mesial cavity ; the second bicuspid has lost its crown, and only its root remains ; the first bicuspid is normal, a small vacancy existing between it and the large but duly proportioned cuspid ; or supernumerary lateral of long narrow cusped form occupies a palatal position between the cuspid and the wide and short lateral ; the very large and bicusped central has a small fissure-cavity in the palatal part of its neck. This case was, of course, conjectured for merely illustrative purposes.

The ten deciduous superior teeth, with the sixth-year molars present, would be expressed as follows :

6, 7; 6; 3; 2; 1; ;1 ;2 ;3 ;6 ;7 ,6

The same denture would be represented as subjoined by the Dubois-Cunningham system :

12 .10 .8 .6 .4 .2 .1 .3 .5 .7 .9 11

A careful comparison and alternative trials of the two systems will enable one to decide for himself their relative readiness and efficiency in use.

Dr. Louis Ottofy, Chicago, wished to make a statement. He had intended to present a continuation of the reports of past years on implantation, but he had only been able to get statistics from two men. One of these reported more failures, bringing his percentage of successes down from 75 to 60. The oldest operation among the teeth which failed was performed three years and five months before the end came. The only cause assigned for the failure was absorption. The tooth was apparently in good condition until June of this year, when it became loose and dropped out. Dr. Fletcher, of Cincinnati, has implanted eleven teeth under peculiar circumstances, nine in the jaw of a goat and two in the hind legs of the animal, with the skin pulled over them. They were implanted at intervals, and were examined every once in awhile. The oldest operation was performed a year ago ; the latest, four months since. In all there was absorption. Dr. Fletcher's idea was that the building up and absorption of tissue went on all the time, extending even to the implanted teeth, the difference being that in the living tooth the absorbed tissue was replaced, while in the implanted tooth, which was dead, there was no replacement. As a consequence, after a time the support of the implanted tooth was gone.

Dr. A. H. Thompson, Topeka, Kan., thought there ought to be a uniform system of notation for the use of dentists. It did not matter much what sort of a system it was, so that it was comprehensive and uniform. Certainly steps should be taken to have some system made the official and only one to be recognized.

Dr. H. A. Smith. Such a system should be adopted, but the work should be more far-reaching than anything which could be done by this association alone. France and Germany were already at work upon the subject, and if this association could work in connection with them it would be well.

Dr. P. T. Smith, Denver, Col., had often felt the necessity for some system of notation, and he heartily concurred in the ideas advanced by the paper. Having a clear idea of the value of such a system, he had adopted for his own use a method of indicating the teeth by vertical and horizontal lines with variations and symbols to indicate the various operations, which had been a great convenience to him. [Dr. Smith here showed an example of his method on the blackboard.]

Dr. Ottofy. Dr. Patrick has prepared a plain table with clear directions, and the Section has made arrangements to have them printed for the use of those who may wish to engage in the investigation. Those in cities where there were collections of pre-historic crania could readily take part, and the Section would be glad if the number who would do so could be ascertained. For the present the work would be confined to pre-historic skulls.

Dr. H. B. Noble, Washington, D. C., recognized the usefulness of Dr. Patrick's work, and he could see how, if all took hold, there would be a report of the highest value. There were in Washington, as was well known, large collections of pre-historic skulls, and he hoped to be able, with assistance, to go through them carefully.

Section VI was passed.

Section VII, Anatomy, Pathology, and Surgery, was called.

Dr. M. L. Rhein, New York, secretary of the Section, read the report, which made an appeal for more scientific work. It was not creditable to the American Dental Association that the student of to-day had no better means of studying oral anatomy than was available twenty years ago. A text-book giving in detail the anatomy of each tooth and its relation to the surrounding tissues was imperatively needed. Many members of the profession hesitated to take charge of oral surgery cases, because they felt that their knowledge of the anatomy of the oral cavity was defective. Oral surgery should be taught in the colleges as operative dentistry was, by having the students perform operations under the direction of anatomical demonstrators.

The Section had two papers to present, one by the secretary of the Section, the other a voluntary paper, by Dr. Arthur C. Hugenschmidt, of Paris, recommended by the committee on voluntary essays.

Dr. Rhein read Dr. Hugenschmidt's paper, which was entitled, "On the Occasional Origin of True Chronic Alveolar Abscess from Teeth with Living Pulps." The writer advanced the idea that a dead pulp was not necessary to the establishment of a true alveolar abscess ; that a tooth with a living pulp, one which retained all its normal physiological functions, as sensitiveness to extremes of temperature, sensibility of the overlying dentine, etc., could be the source of a chronic suppurative inflammation which in its consequences and clinical aspect was absolutely similar to an abscess due to a completely devitalized tooth. In support of this proposition he related three cases occurring in his practice, in each of which the existence of abscess primarily led him to suppose he was dealing with a dead tooth, but in each of which he found the pulp living, necessitating its devitalization and extirpation for the cure of the lesion, which facts led him to the conclusion that true alveolar abscess could occur from a living tooth. Two circumstances were observed in all the cases,—a localized pathological condition of the pulp, and an abnormally large apical foramen. The former of these he believed to be the primary cause, and the latter a necessity to the occurrence of abscess from living pulps. In one of the cases, a young lady of well-marked lymphatic temperament, seventeen years of age, the origin of the trouble was probably a local pulpitis due to a small gold filling inserted when the patient was twelve years old. Calcification of the roots not being then complete, arrest of development occurred, resulting in the extremely large foramen noted. The other cases were observed in persons over thirty years of age. In these the explanation of the enlarged foramen probably was to be found in the fact that irritation of the pulp, from whatever cause, always resulted in hyperemia, which, if long-continued, produced a hypertrophic condition of the pulp, followed later by absorption of the minor part of the root, causing an enlargement of the pulp-cavity, as has been clearly defined by Dr. Black. For an alveolar abscess to be present in a living tooth this enlarged condition of the foramen was necessary ; as otherwise pulpitis would produce congestion of and strangulation of the pulp at the foramen, unless the pulps were exposed in the crown, thus affording an opening for the escape of the inflammatory products. Hardly any pain was experienced by the patients, which was also explained by the enlarged foramen preventing compression of the pulp. The diagnostic signs were : First, the presence of an alveolar abscess immediately opposite the end of the root of a tooth; second, a slight change in the color of the tooth, —a darker hue; third, the indication by the patient that that tooth, and that tooth only, was the seat of slight annoyance but no pain. These signs being present, one need not hesitate to trephine the suspected tooth, even if it were sensitive.

Dr. Rhein also read his own paper, under the caption, "Amputation of Roots as a Radical Cure in Chronic Alveolar Abscess," in which he said, that although amputation of a portion or the whole of the root for the restoration to health of teeth which did not yield to milder treatment had long been advocated by the few, the text-books were singularly silent about this important procedure. Usually the operation presented no difficulty, and, except in the region of the antrum or the mental foramen, no dangerous anatomical points were involved. The instruments required were a sharp spear-shaped drill to open through the process and root, and a new fissure-bur, which, following the drill and worked laterally, severs the root. As a rule, no anesthetic was required. The longer an alveolar abscess existed, the greater the damage to surrounding tissues, the apex being denuded of circulatory supply and finally passing into a necrotic condition which gradually extended until the entire root was necrosed. Treatment through the canal was useless after necrosis had once attacked the apex. The method of treatment which the writer advised in such cases was to fill the root or roots, excise the diseased portion, following with a vigorous use of the bur in the surrounding pathological tissue. If the operation were performed under aseptic conditions and the parts kept so until the wound was entirely healed, an immediate and radical cure resulted.

Dr. Rhein cited several cases from his practice, showing the details of the operation and treatment. Comparing the absolute cure which followed this operation with the uncertainty of every other method, he felt that it was not unreasonable to ask why it was not done more frequently.

He also advocated amputation of the roots in cases of pyorrhea alveolaris complicated with alveolar abscess,—that is, where through the ravages of the pyorrhea death of the pulp had ensued, which usually occurred without warning to the patient. The diagnosis of such a pulpless tooth was very difficult, because the color remained good, even the electric lamp failing to indicate the death of the pulp, for the reason that the canal was filled with purulent matter of a watery consistence, so that the tooth was translucent as in the normal condition. The only reliable diagnostic test was to isolate the tooth with the rubber-dam and apply intense cold or heat. The smallest amount of the spray of the chloride of methyl was admirably adapted for this purpose. As a rule, such teeth were regarded as hopelessly doomed, but Dr. Rhein had been successful in preserving them by root-amputation, cases of which he related. From his experience he concluded that "wherever death of any portion of a tooth has taken place, the simplest cure is to amputate the necrosed portion of the root and the tissue will close firmly about the remaining healthy portion, which will suffice to support the tooth. In teeth of more than one root, where often an entire root becomes necrosed, this may be safely amputated, and the tooth generally will be well supported by the remaining root or roots."

Dr. J. Taft, Cincinnati, read a memorial to the Senate and House of Representatives at Washington, asking them to pass the bill now before them to regulate the practice of dentistry in the District of Columbia, and moved its adoption. The motion was carried.

Adjourned to 7.30 o'clock P.M.

Evening Session.

The association met at 7.30 P.M., President Foster in the chair.

Dr. W. W. Allport, Chicago, offered a resolution leaving the selection of the next place of meeting to the committee of arrangements, which, after discussion, was adopted.

The election of officers for the ensuing year was then proceeded with, Drs. J. N. Crouse and E. E. Hughes acting as tellers. The result was announced in the DENTAL COSMOS for September.

The newly-elected president, Dr. A. W. Harlan, of Chicago, was conducted to the chair and was introduced by the retiring president, Dr. Foster, who expressed his thanks for the courtesies extended to him as presiding officer.

Dr. Harlan, in expressing his appreciation of the honor which had been conferred upon him, promised to do all in his power to make the next meeting a success, and he hoped with the aid of the members to discharge his duties to their satisfaction.

On motion of Dr. Ottofy, a resolution commendatory of Excelsior Springs as a place for the meeting of scientific bodies was unanimously adopted.

The special order, the presentation of the lantern exhibits from Sections IV and VII, was taken up.

Dr. A. O. Hunt addressed the association on the "Blood-Supply of the Teeth." His attention had first been drawn to the subject many years ago by the action of arsenic which had been applied to a tooth and allowed to remain there a week. The tooth was so loose that it was lifted out with the fingers, and one of the things that struck him with peculiar force was that the peridental membrane was of a creamy whiteness. Its coloring-matter was entirely obliterated, leaving only the connective tissue. He queried why the action had not been carried into the territory of the main artery which was supposed to nourish the tooth through the foramen, whereas the peridental membrane surrounding the root seemed to be the only part affected. The subject attracted renewed attention from him through seeing Dr. Patrick's demonstration of the method of blood-supply to the follicle of the developing tooth. That renewed his thought about the peridental membrane and its function. In the "American System of Dentistry," the peridental membrane was described as spreading out to form a fan-like appearance. In order to follow out his ideas, it became necessary to obtain specimens with the parts *in situ*, and this he found it difficult to do. The injecting fluid used in preparing the specimens was gelatine carmine, which was injected through the carotid artery. Sections were cut from the jaw and placed in absolute alcohol, and in grinding them down no water was used, the specimens being kept all the time in alcohol. What he believed to be true and what he expected to show was that the blood-supply of the tooth did not pass directly from the artery through the foramen, but that it was distributed through the cancellous bone by a number of small branches, and all along the peridental membrane by a system of capillaries. Neither did he believe that the nerves passed directly through the foramen, but that they reached the tooth by a circuitous route, accompanying the blood-current. All the blood-vessels, so far as he had been able to observe, stopped on the outside of the membrane, and the supply was there taken up and distributed by a system of capillaries. One of the specimens (a fetal tooth of eight months) showed this clearly, and he maintained that the course there shown was kept up in the developed tooth. [Dr. Hunt here showed with the aid of the lantern a number of slides presenting evidence of the correctness of his views.] Continuing, he said that he thought he had demonstrated positively that the blood-supply of the developing tooth was derived as he had stated; but if the old idea were correct, that the blood-supply of the developed tooth passed directly from the artery through the foramen, then it must be that the order of nutrition changed from that which prevailed in the developing state; that the order which built up the tooth and the order which sustained it after it had been built up were not the same. That he did not believe was possible. On the contrary, he believed that the order was the same all through the life of the tooth; that the office of the peridental membrane was simply to sustain what it had built up. He had never been able to trace a nerve-fiber to the foramen directly, and he doubted that it entered the tooth in that way.

Dr. W. X. Sudduth, Minneapolis, in presenting his lantern exhibit of "Tumors," said that the tumors of the mouth differ little from other tumors, except that certain ones seemed to have a preference, so to say, for the mouth. Epithelial tissue was never transformed into connective tissue. There was no particular cell which was pathognomonic of special tumors, and distinctions between benign and malignant were made on the history, size, location, and microscopical examination. Three classes of tumors were to be considered : (1) the simple hypertrophy, which was only an increase in size of the tissue affected, of which the myoma was an example ; (2) the carcinomas, which arose from degeneration of epithelial tumors. These were the most malignant of any except perhaps (3), the round-celled sarcoma, which belonged to the connective-tissue group. [Dr. Sudduth then made an interesting exhibit of lantern slides, showing sections of the various forms of tumors.]

Adjourned till 9.30 A.M. to-morrow.

FOURTH DAY—*Morning Session.*

The association was called to order by President Harlan.

The newly-elected first and second vice-presidents, Drs. J. D. Patterson and H. B. Noble, were installed.

Dr. Sudduth offered a resolution providing for the appointment of a committee of five to prepare a plan for the expedition of business, to report at the next annual meeting, which was adopted. The chair appointed as the committee Drs. W. X. Sudduth, M. L. Rhein, P. T. Smith, A. E. Baldwin, and D. R. Stubblefield.

The committee appointed to take into consideration the proper measures to be taken in the matter of the case involving the constitutionality of the New Hampshire law regulating the practice of dentistry reported through its chairman, Dr. Patterson, recommending the appointment of a committee of five to investigate the case, and if thought desirable to employ counsel, and the appropriation of $250 to cover the expense.

Dr. A. E. Baldwin moved to increase the appropriation to an amount not exceeding $500, which was accepted ; the recommendation was then adopted, and the committee appointed as follows : Drs. L. D. Shepard, Thos. Fillebrown, T. S. Waters, Geo. H. Cushing, and J. H. Martindale.

Dr. Crouse suggested that the vacancy on the committee appointed to examine the workings of the Dental Protective Association caused by the inability of Dr. Goddard to serve should be filled, and that the members of the committee should have permission to conduct their examination separately if they so desired, and authority to publish their report when most convenient. Agreed to. The president appointed Dr. I. P. Wilson, Burlington, Ia., to the vacancy created by the resignation of Dr. Goddard.

The president appointed Drs. E. T. Darby and Edmund Noyes members of the publication committee.

The discussion of Sections IV and VII was passed.

Section I, Prosthetic Dentistry, Chemistry, and Metallurgy, was called, and Dr. W. B. Ames, of Chicago, the secretary, read a brief report, calling attention to a number of new appliances, among them combination pliers, a blow-pipe, and a ratchet wrench, by Dr. L. M. Mathews, of Lawrence, Kan., and a porcelain tooth by Dr. Floyd. The Section would also present papers by Drs. C. S. Case, E. Parmly Brown, and D. R. Stubblefield.

Dr. C. S. Case, Jackson, Mich., read his paper on "A System for constructing Porcelain Crowns," an abstract of which follows:

Alluding to the steadily growing popularity of crown and bridge dentures, proficiency in the supplying of which had become almost indispensable to the dentist, the writer stated that in the vast variety of methods offered there was a constant growth toward perfection, insuring permanency with physiological and hygienic requirements. The object of this paper was to suggest certain improvements in the construction of the so-called Richmond porcelain front and other tooth-crowns. The common method of cutting the tooth squarely off and beveling it anteriorly even with or below the gum margin was objectionable. His practice, in the six anterior teeth, was to dress the face of the root to conform to the curved border of the gum, the labial edge slightly beneath the gum, the palatal only to the palatine prominence. Make a ferrule wide enough to extend one-third the length of the crown, and mark on the inside the peripheral edge of the root. Remove and cut a scallop, front and back, nearly to this line. Readjust and dress down with corundum stone till the edge is even with the face of the root, varying the approximal extensions according to the crown used. Bend a piece of pure gold, No. 32, or platinum no thicker than writing-paper, into the curve, solder, trim, and finish. This formed an impervious cap, of a shape which afforded the strongest possible mechanical attachment to the root, and equally adapted as a base for the so-called Richmond, the Ash, the Case, or the Logan crown.

The labial border should fall slightly beneath the edge of the gum. Take bite and impression in plaster of the parts, make antagonizing models with the cap in position on the model, when the cap is ready for the fitting of the porcelain tooth. To obviate the existence of spaces between the cap and crown for the retention of food, he used hard jewelers' enamel, the possibilities of which in prosthetic dentistry were suggested to him by seeing Dr. A. E. Matteson demonstrate its use for porcelain inlays at a clinic of the Chicago Dental Society last winter. Mixed with water to a thin paste, it formed an invaluable luting between backing and tooth, and in all spaces where porcelain and metal came into contact, as the heat required for soldering fused the enamel, thus forming an impervious stopping against the ingress of secrētions and adding greatly to the strength of the attachment.

For the so-called Richmond crown select a porcelain face, lute with enamel, and back with platinum, leaving the pins extended if desired to grasp post. Flow solder around the pins to fuse the enamel and prevent displacement. Grind tooth to fit the cap, allowing the approximal extensions to fall alongside of backing, and the cervical border of the tooth to stand slightly in front of the cap, subsequently rounding and finishing the edge to the band. Prepare the root-canal, replace the cap on the root, punch hole for post, place parts in position, secure with plaster, remove, and solder. For a long-bite tooth a shell may be struck, fitted, and soldered to the adjoining edges of cap and backing with less expenditure of time and material than in producing a crown of the natural contour and sufficient strength.

The Ash tube teeth may be readily set by this method, allowing the approximal portions of the cap to extend well down the tooth. Grind to place on antagonizing model ; mark and bore hole for a clasp-metal post, which should be drawn to exactly fit tube in tooth. Adjust cap to root, and bore through hole into the canal. Remove cap and prepare root for post. Replace cap, tooth, and post, if necessary bending the latter to allow the tooth to take its proper position, secure with plaster, remove, and solder post and crown together. Adjust and fit to cap, roughen surface of post and cap, lute with enamel, and bring to required heat for fusing.

The Case crown was like the Ash, except that the tube was large enough to admit a second tube, which was originally intended to be threaded for use with a How screw-post. The method of construction was the same as described for the Ash tooth.

In fitting the Logan crown a slit was cut in the face, the pin forced through it, and the porcelain ground and fitted as the others previously described, luted with enamel, and the post soldered from the upper side.

By the aid of a wooden model, made as described in the DENTAL COSMOS for June, 1885, this method could be readily adapted for the construction of molar and bicuspid crowns (though even this was not necessary always, as experience would enable one to cut the flap of the proper width without the model), thus making it a complete system for making porcelain-front crowns for any of the teeth.

Dr. E. Parmly Brown, New York, in lieu of a paper, stated that he had made a number of improvements in his porcelain crown, the principal of which was a change in the form of the pin, which was also now made milled. He had found that a blunt-ended pin was not the best thing to put into glass. The pin as now made had a double-ended taper, which agreed better with the shape of the canal and which held better. It was milled in manufacture. The pin should be about the size of or a little larger than the natural channel. He never cut away dentine to put platinum in its stead, unless it was to gain strength. All the sound tooth-substance possible should be retained.

Dr. D. R. Stubblefield, Nashville, Tenn., read a paper on "Amalgamation and Dental Amalgams."

Dr. Stubblefield had chosen this very old subject because there was so much in the nature and special characteristics of this interesting combination of metals that was not clear in many minds, or rather that such explicit knowledge was not in any minds regarding the ultimate nature, actual and comparative, of amalgams. The remote history of combining metals with mercury was obscure, its discoverer unknown. Theophrastus (300 B.C.), who gave a method of preparing "liquid silver" from cinnabar, seemed to be the first to mention mercury. References to its combination with other metals were found in later works, from Pliny down; the principal use made by the ancients of the knowledge of its solvent power upon other metals was in the recovery of gold. The union of mercury with other metals—amalgamation—long since assumed the definite nature which belonged to recognized chemical compounds. Among the phenomena observed in amalgamation differing from the ordinary course was the fact that heat was sometimes rendered latent, sometimes evolved, first observed by Demachy in 1774. One hundred years later J. Reynauld found that heat was absorbed in the combination of mercury and zinc and evolved in its union with cadmium; also, that amalgamation changed the electro-chemical relations of metals, those which absorbed heat becoming more electro-positive, and those which evolved it becoming less so. Zinc, lead, tin, iron, nickel, and cobalt belonged to the first class; sodium, potassium, and cadmium to the second. It has been definitely ascertained that mercury combined in regular proportions, as in any other chemical union, and there were formulas for its combinations with single metals, but the writer had not seen any compound formulas to set forth such complicated compounds as dental amalgams.

Calvert and Johnson have published that tin amalgam was the best conductor of heat, bismuth amalgam the worst, and that in each the conductivity increased with the decrease of the mercury used. Reasoning from this, it might be worth while for manufacturers to introduce bismuth into their amalgams, and something practical might be evolved from the fact that the decrease of mercury measured the increase of thermal conductivity.

The presence of a small quantity of foreign metal in mercury caused a marked decrease in electrical resistance, but the conductivity was not the mean of the two metals, the first of which might be construed as an argument against the use of amalgams but for the fact that the real merit of electrical currents in and through the body was a moot question. The writer presented the results of experiments into the conductivity of various metals compounded with mercury, from which, in connection with the other facts set forth, he reached the conclusion that amalgamation produced chemical compounds more or less unstable and uncertain in their actions under examination. The definite amalgams, so far as known, were crystalline in structure.

Many of those present doubtless recalled the earliest advent of amalgam into dentistry, though who first presented it the writer had been unable to discover. At first its use was treated with suspicion, and actual enmity and outright opposition were developed. Everything in connection with its early history was vague and uncertain. Those who dared to use it felt guilty, and, like Peter, were ready to deny that they knew it. The great wonder was that it survived the powerful, unrelenting, and undiscriminating persecution it met with. Were it not for the law of the survival of the fittest, it would to-day only be a tradition, instead of occupying, as it did, a more or less conspicuous place in every dental office in the land. In those early days, little if any method governed its preparation. Empiric combination of almost any metals, so that they differed, was the vogue, the varying compounds presenting as diverse qualities as they themselves were various, and not all of them answering well as dental amalgams. They did not have sufficient edge-strength, did not keep their color well, did not resist the disintegrating influence of saliva aided by heat and moisture and the adventitious presence of organic acids, resulting in discoloration of the tooth-structure by unsightly sulphides, or they expanded or contracted when setting. These properties were gradually brought within control.

The paper then stated the well-known characteristics of the individual metals, tin, silver, gold, platinum, copper, and zinc alloyed with mercury. By a judicious throwing together of several of these, each contributing to and modifying the whole, practical workers have reached satisfactory combinations. A point which had not been sufficiently emphasized ordinarily was that each different combination should have just a certain quantum of mercury added to yield the best results, which were modified by the excess at one time or the too little plasticity at another. For the reason that zinc in small proportion seemed to control the expansion or shrinkage of an amalgam and to enable it to keep its color, the writer had been partial of late to amalgams containing this metal. He would concede to copper amalgams an equality, but nothing more, unless the claim for superiority was based on some other ground than its power to permeate the tooth with salts of healing derived from itself without loss of structure.

As to the use of amalgam as a filling-material, he merely claimed that there were cavities in certain mouths which, from the very nature of the disabilities under which the operator must labor, could better be filled with plastics than with anything else by anybody. He had no sympathy with slovenliness or slipshod ways, and he made the plea for the use of plastics inside the pale of respectability in the profession. Amalgam had never had a fair chance in the world. It was born under adverse circumstances and under unpropitious stars, and it was at once relegated in effect, if not in fact, to the kitchen and the scullion. It was not used, not recognized by the best and most expert, and when tolerated it was merely to begin an unequal fight for existence as the custodian of a tooth "not worth anything so expensive as gold." It had been sneered at and scoffed at since its earliest hour, but, like another "ugly duckling," it had survived disgrace, and the day was not far distant when the best and deftest would hail it as their truest friend when their need was sorest. It was at last being given a fair trial almost everywhere and by everybody, and it would yet convince the most skeptical that it has qualities which render it valuable in many places. A year ago, in Galveston, he was taught that it was excellent for filling the canals of pulpless teeth. He had used it carefully, and with better results than anything else he had ever used as a root-filling. Dr. Miller, of Berlin, has placed copper at the head of filling-materials as to relative germicidal power, and the only one that seemed to exert other opposition than the physical lockout. If this were true, and if in root-canals aseptic power were desirable, the practice seemed good.

An amendment to the constitution, striking out the clause permitting the officers to change the time and place of meeting on a two-thirds vote in the affirmative, was offered. Laid over under the rules.

The usual votes of thanks were adopted, and the association adjourned to meet the first Tuesday in August, 1891, at the place to be designated by the committee of arrangements.

Dr. Peirce, chairman of Section II, desires the following correction in his report on education, an abstract of which appeared in the DENTAL COSMOS for October:

Since the last meeting of this body three States have so modified their dental law as to require an examination and indorsement of all who propose to practice within their borders or commonwealth, without regard to where the graduate's diploma or certificate was acquired. Mississippi, New Jersey, and Minnesota are the three States, Massachusetts having inaugurated this step three years previously.

THE DENTAL ASSOCIATION OF VICTORIA.

THE first annual meeting of the Dental Association of Victoria was held July 31, 1890, Dr. Springthorpe presiding.

The secretary read the first annual report of the association, which contained statements to the following effect:

The association was duly registered and incorporated on the 4th of December. The question of the establishment and management of a dental hospital engaged early and considerable attention. After long and careful deliberation, a series of rules for the maintenance and government of such a hospital were drawn up, and the council had been pleased to find that these rules have been adopted without alteration at a general meeting of subscribers to the hospital. In accordance with these rules a committee of management had been elected. The council was indebted to Mr. Blitz for the gift of the valuable building where the hospital was situated. The privileges of members of the association and of the profession generally had not been neglected. The council had decided that dentists using letters or additions to their names, implying the possession of a diploma, where no such diploma exists, or using letters or additions to their names denoting the possession of recognized diplomas and not actually possessing such diplomas, shall not be eligible for election as members of the association. The committee had much pleasure in stating that, in pursuance of its rules, the following gentlemen have been elected the first honorary members of the association: the president of the British Dental Association, the president of the New Zealand Dental Association, the president of the Dental Board of Victoria. Forty-eight dentists have been enrolled as members during the year, and two associates.

EDITORIAL.

EDUCATION OF THE PUBLIC.

THE propriety and desirability of educating the public with reference to personal, house, neighborhood, city, state, and national sanitation has come to be recognized as essential to the national health. The medical profession has earnestly sought to convince the public of the value of obedience to hygienic laws, and to secure to the people at large the benefit of sanitary science. To some small extent these efforts have been appreciated, as the evidence has been presented of the arrest of epidemics and the prevention of the spread of infectious diseases. But the vast importance of the subject is not yet adequately comprehended by the general public. Sanitation, hygiene, prophylaxis, the laws of health, have been the texts of innumerable essays for the benefit of community. Treatises without number have been written and published on the hygiene of the various organs of the body ; on the hygiene of age and occupation ; on the hygiene of the dwelling, the school, the factory ; on dress, diet, sleep, rest, work and overwork ; on ventilation, drainage, disinfection, adulteration of food and water supplies ; on the care of the sick and aid in emergencies ; on the summer and its diseases, the winter and its dangers, preventable diseases, the art of nursing, etc.,—all intended and calculated to diffuse as widely as possible a knowledge of the elementary facts of preventive medicine and the bearings and applications of researches in every branch of medical and hygienic science. Notwithstanding these labored and persistent efforts, it is marvelous what little interest comparatively is evinced by the public in whose behalf they are put forth. Even among the well-to-do classes, those of more than average general intelligence, how little is known concerning the physiology of the human body, the location and function of important organs, the circulation of the blood, respiration, digestion, assimilation, etc. !

What wonder, then, that there is so little known of the mouth and the teeth,—their development, anatomy, periods and order of eruption, the relation of the sixth-year molars to the deciduous and permanent dentures, the shedding of the temporary and eruption of the permanent teeth, the nutrition of the teeth, their nervous, regional, and systemic relations, the care of the teeth, and the hygiene of the mouth!

There can be no question as to the importance of a wide diffusion of information in regard to these matters, and of an effort to awaken a general interest in the prevention and arrest of decay and loss of the teeth.

If, as has been said, the real groundwork of national health is the education of the masses, so an intelligent comprehension of the varied functions of the mouth and teeth, a better appreciation of the causes of deterioration and of the means by which it may be counteracted, is essential as the groundwork of a much needed improvement in the dentures of mankind. Dental colleges may multiply and each recurring year send out their hosts of graduates, legislatures may pass laws regulating the practice of dentistry, and thousands of operators may be kept busy in the work of repair, and still the deterioration will go on, and still a vast amount of preventable disease will make its ravages.

The remedy is the education of the people. They must be made to realize the priceless value of their dental organs ; fathers, mothers, and children must be made to understand that neglect which involves the loss of teeth is inexcusable and suicidal. How to disseminate such knowledge is a problem which may well engage the attention of dental organizations.

DR. W. D. MILLER.

Dr. Miller's recent brief visit to this country was made the occasion of banquets in his honor in the four principal cities which he visited, namely, Cincinnati, Buffalo, Philadelphia, and New York. Of the demonstrations in other cities we have only newspaper reports, but these indicate a warm welcome in each instance.

The Philadelphia reception was tendered by representatives of the dental profession under the auspices of the Odontological Society of Pennsylvania. It was attended by a large number of leading dentists and physicians. The formal toasts were felicitously responded to, and were as follows: "Our Guest," Prof. James Truman; "The Dental Specialty in Europe," Prof. W. D. Miller; "Educational Demands of the Healing Art," Prof. William Pepper; "Modern Methods in General and Dental Surgery," Prof. W. W. Keen; "The Relation of Modern Pathology to Dentistry," Prof. Ernest Laplace; "The Bond of Union between Dentistry and Medicine," Prof. Harrison Allen.

It is our purpose to give an abstract of the responses in a future issue of the Dental Cosmos.

These several occasions demonstrated the high esteem in which Professor Miller is held by his countrymen, and their recognition that he is fairly entitled, as one of the speakers at the Philadelphia banquet happily put it, to be considered the Lister of dentistry; indeed, the immediate practical value and the far-reaching influence of Professor Miller's researches and demonstrations are comparable not only in dental practice, but in their relation to the pathology of the alimentary tract, to Listerism in surgery. His labors and his successes fitly class him with the masters of science in medicine, and the profession honors itself in honoring him.

BIBLIOGRAPHICAL.

Practical Dental Metallurgy. By Thomas Fletcher, F.C.S., Warrington. Octavo, illustrated, 72 pp., with 15 pp. of addenda. Printed and published by Mackie & Co., Warrington, England, 1890.

This small volume has more generally available practical information to the square inch than any work of the kind within our knowledge. There are many special devices illustrated and advertised by the author, whose fertility in the invention of well-working calorificators is remarkable and worthy of such mention; but aside from these, his descriptions of the means and processes for effecting and controlling the dissolving and the fusion of metals and their alloys will enable the practitioner or the student to accomplish with readily accessible materials every variety of practical metal-work and metallic compositions which the intelligent dentist should be able to do. There is, moreover, a large number of incidentally useful facts and formulas included in this little book which every dentist should have at hand.

OBITUARY.

DR. SAMUEL EVERETT MARSHALL.

DIED, at Milford, Del., September 11, 1890, of typhoid fever, **SAMUEL EVERETT MARSHALL**, D.D.S., in the twenty-ninth year of his age.

Dr. Marshall was born at Georgetown, Del., September 6, 1862. He was educated at Claverack College, Claverack, N. Y., and was a graduate of the Pennsylvania College of Dental Surgery, of the class of 1885. He was the son of Dr. William Marshall, of Milford, Del., and he located and practiced his profession of dentistry at that place. Dr. Marshall was a conscientious and earnest worker; was of a genial disposition, and much liked professionally and socially. He was a member of the Presbyterian Church.

HINTS AND QUERIES.

IMPROVED VULCANIZATION.—Dr. George B. Snow, in the *Dental Advertiser* for October, describes an improved process of vulcanization which has the merit of adaptation to any of the methods and vulcanizers in common use, "but as it will be necessary to heat the flask twice, it will also be advisable to use some kind of spring-clamp possessing power enough to make the rubber flow and readapt itself when reheated.

"In the ordinary method of molding a plate in a bolted flask, gateways are cut to provide for the escape of surplus rubber, and the mold is packed with a sufficient quantity of gum to fill it. The two parts of the flask, being bolted together, are heated to soften the rubber, and the flask is closed, any surplus rubber oozing from the mold into the gateways. The flask is then put into a vulcanizer, and heated to the vulcanizing point. While the heat rises, the rubber continues to expand, and it is constantly oozing from the mold into the gateways. If it were cooled, even before it reached the vulcanizing point, there would certainly be a vacuity somewhere in the mold from contraction.

"The moment the vulcanizing point is reached, and the temperature becomes stationary, shrinkage begins; the expansive pressure is relieved, and in a few moments the mass of rubber becomes too small to fill the mold. As it adheres to the surface of the plaster, it is drawn away from the teeth and pins, to which it has less adhesion, as the rubber will not pass from the narrow gateways back into the mold to fill the vacuity, except possibly to a very limited extent. . . .

"The *modus operandi* of the new process will be as follows: Prepare the flask for vulcanizing as usual, cutting away all the exposed surface of plaster outside the mold except a narrow margin, not to exceed one-eighth of an inch immediately around it. (See Dr. How's article in the DENTAL COSMOS for July, 1889.) Be sure that the guide-pins do not fit so closely as to prevent the easy separation of the flask. Ascertain the amount of rubber necessary to fill the mold, and allow but little surplus.

"Place the flask in a spring-press and close it, interposing pieces of thin metal at three or four different points, about No. 30 gauge for upper sets or double the thickness for lower sets, to prevent the complete closure of the flask. Place the flask, in the spring-clamp and under pressure, in the vulcanizer, and vulcanize for about half the usual time. Cool slowly enough to avoid injury to the plaster from formation of steam within its substance, open the vulcanizer and remove the pieces of thin metal, apply the full pressure of the spring-clamp, and finish vulcanizing.

"The additional rubber retained in the mold by the interposition of the thin metal will be sufficient to allow the clamp to follow up the rubber as it shrinks, and keep the plate under pressure until it is too cold and hard to change its shape. There are sorts of plaster which become soft and "mushy" so soon when used in vulcanizing that a mold made of them will give way when the second pressure, alluded to above, is applied. To preserve all the hardness possible to the mold but little water should be used, the flask should be surrounded by steam only, and the air should be expelled from the vulcanizer to insure an equable heat. For the same reason the second pressure should be applied early, and before the plaster has become softened.

"The following precautions must be observed: Any sudden change in the steam pressure may result in the formation of steam in the flask and injury to the contents, as it is not held together as it usually is. Therefore no escape of steam, by opening the blow-off or blowing out the safety-disk, should be allowed. Neither should the vulcanizer be suddenly cooled by putting it in water or otherwise.

"It is believed that the results obtained will amply repay the operator for what little additional trouble he will incur in using this method of vulcanizing."

He shows by a series of scientific laboratory demonstrations that the common modes of vulcanization invariably produce defective dentures, and that these defects not only weaken the work, and occasion misfits with resultant inefficiency and discomfort for the patient and corresponding disgrace to the dentist, but are the causes of the indescribably disgusting pollutions and stenches usually accompanying the wearing or repairing of common vulcanite dentures.

Dr. Snow will become both a public and a professional benefactor if dentists generally shall be able, by adopting his improved process, to so compensate the unavoidable shrinkage as to produce vulcanite dentures that shall both cling and be cleanly in the mouth, and if improved apparatus be requisite for the realizing of such results, their attainment will well repay the outlay, whatever, within reason, the cost.—W. S. H.

TOOTH-CROWN MODIFICATION.—In recent years there have been suggested combinations of old and new methods of making and mounting tooth-crowns, and the following description of my mode of utilizing the plain rubber porcelain tooth for a bicuspid crown will be found to be both simple and practical. After preparing a tooth-root as for an all-gold crown, by fitting over the root-neck a gold collar of the proper width, as in Fig. 1, remove and cut away the front of the collar (Fig. 2). Bevel the labial edge of the root so that the tooth can set well into the collar (Fig. 3). Replace the collar on the root, dry out, and place a little softened wax onto the end of the root. Select a suitable plain rubber tooth, nip off the heads of the pins, grind so that it will enter the collar, adjust, and articulate, pressing the tooth against the wax. Carefully remove the collar and tooth (Fig. 4). Invest in plaster and asbestos fiber (Fig. 5). Fit a thin piece of platinum into the collar, burnishing it down onto the tooth, and bending it down to the pins. If it is desired to use a post, remove and punch the platinum plate at the proper place, and solder in a post; replace within the collar, and secure with a piece of binding-wire imbedded in the investment (Fig. 5). A little 18k. solder will join together the collar, platinum plate, and tooth-pins (Fig. 6). If there are any places where the collar does not fit the tooth closely, pack in gold foil before soldering. If the inner cusp does not fill the collar, or it needs lengthening for occluding purposes, get the desired shape with wax when fitting the tooth. Remove the wax after investment, pack in gold foil pellets, and add enough 20k. solder to flow through it, and the desired addition will appear as in Fig. 7. The completed crown, mounted as usual with cement, is shown in Fig. 8.

FIG. 1.

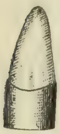


FIG. 2.

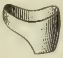


FIG. 3.

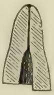


FIG. 4.

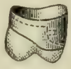


FIG. 5.

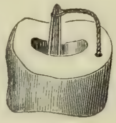


FIG. 6.

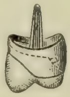


FIG. 7.

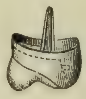
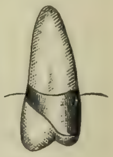


FIG. 8.



The advantages of this method are its simplicity, ease of adaptation and articulation, the short time required to fit and make the crown, its strength, security, and natural appearance, and the convenience of using a plain rubber or saddle-back tooth.—WM. H. SHULZE, Atchison, Kansas.

TO RETAIN COLLARS ON TEETH OR ROOTS.—Having found it difficult to retain on the teeth such collars as are cemented on for regulating purposes, the phosphate getting loose from the enamel, I found that by putting on the rubber-dam, drying the tooth and shellacking it first, this gave the desired ground for the cement to adhere to, and I was able to fasten a narrow band on a cuspid and central, to retain it for weeks, and in removing the same I was compelled to split the band. The shellac varnish is not alone useful as regards the foregoing, but I think that on all roots which it is possible to coat with it the crowns will be much firmer held. There are many cases of bridgework where one does not care to destroy the crowns by cutting them off, such as a bridge of the upper incisors, retained by collars on the cuspids; or lower centrals, say of one or two teeth, collared or capped to the laterals.

If the cement in crown-work should in time dissolve from under the collars, the shellac does not, and there will not be any decay under the band, as is usually the case after bands have been in position for two years or more.

In shellacking regulating appliances I would advise the addition of a very little powdered pumice or even plaster; this will give still more strength in the union with the cement. I should like to hear, through the COSMOS, from any who may give the process a trial.—W. G. LANGE, D.D.S., Dallas, Texas.

To Control Occlusion.—"G. M. M.," in the Cosmos Hints and Queries for August, 1890, asks, "What is the best method of inducing, or directing, a patient to bite so as not to throw forward the lower jaw when the occlusion is to be taken in wax for prosthetic purposes?"

I combine two old methods, and do not see how anything could be better, for I have felt no need for anything else during the fourteen years I have followed the plan, which is as follows: Direct the patient to exert the force in closing that he would do if crushing something between the molar teeth or extreme back part of the mouth on both sides at once, and also at the same moment swallow or perform what some writers call "empty deglutition." I am aware that some practitioners will claim that they have tried this plan and found it a failure. If so, the fault was not in the method but in the operator. It requires very great care to always preserve and accurately apply to use even a correct "bite;" and there is no doubt that the patient is often blamed when the fault was entirely with the dentist. If a piece of wood is buried in the wax to arrest closure at a certain point, the soft, yielding gums or ridges may be greatly depressed at that point, so that when the correctly shaped cast is placed in the "bite" it cannot go to its proper place until the points over or at the wood are cut away so as to allow the cast to go to the right place. While it may be that this is not the *best* method, if rightly applied there is no need of a better one.—W. E. Driscoll, Manatee, Fla.

To Melt Platinum.—Take a piece of soft charcoal and make a small cup-shaped cavity in it. Make a like cavity in another piece of charcoal, but cut a shallow groove leading out from the cavity. Place in the first cup three or four pennyweights of platinum scraps or teeth-pins. Cover them with the second piece of coal, so placed that its cup shall be over the other cup. Attach a tube from a nitrous oxide gas cylinder to the mouth-piece of a Melotte blow-pipe, and direct the compound gas flame through the groove in the charcoal onto the platinum. When this is at the point of fusion, put it quickly under blows of a hammer to condense the mass. Repeat the process until the piece is suitably shaped, and then pass it through the rolls for use.—Geo. W. Melotte, M.D.S., Ithaca, N. Y.

A Successful Case of Replantation.—A gentleman of middle age came a year or more ago to have a left upper central removed on account of its looseness, which caused him great annoyance. Six years previously he had loosened three upper incisors by accidentally hitting his head against that of a mule. Two of them were well again in a few days, but there resulted a chronic discharge of pus from around the neck of one tooth, caused by the death of its pulp. The tooth, moreover, had elongated to such an extent that I pronounced it worthless. I extracted it, cleansed the root well, being careful not to injure what little pericementum remained, filled the root-canal, and placed the tooth in a tepid solution of bichloride of mercury 1 to 1000. Finding the alveolar process badly necrosed, I scraped away the sequestrum, washed out the socket with the same bichloride solution, and placed the tooth in position, retaining it by means of a platinum saddle. I have had occasion to see the gentleman several times since, but not for thorough examination, and am therefore unable to state whether or not there has been a new formation of bone; but the tooth appears to be in a perfectly healthy condition, and is quite firm. It has been doing good service for many months.—W. M. Chambers, Guatemala, C. A.

To the Editor of the Dental Cosmos:

Sir,—Referring to the case of death which occurred about a year ago in my office after the inhalation of nitrous oxide gas, you will remember that you gave as a reason why no report of the occurrence appeared in the Cosmos, that it was not considered as being a result of the inhalation of the gas, and therefore not a subject for report in a dental journal.

The case was fully and correctly reported in all of the daily journals except one. It is remarkable that nearly all subsequent references made to the incident have been based upon that one report, which was incorrect in the assumption that the apoplectic seizure immediately followed the inhalation of the gas. A recent writer upon artificial anesthesia quotes verbatim the erroneous report, including even the flippant language of the layman who wrote the article.

Dr. H. C. Wood, in his excellent paper upon anesthetics, read before the recent International Medical Congress at Berlin and published in the Dental Cosmos for October, fell into the same error in saying that "not long since, in the city of Philadelphia, a gentleman arose from a dentist's chair after an inhalation of nitrous oxide, staggered, and fell in an apoplexy."

With your permission I would like to state precisely the circumstances of the sad occurrence.

The patient had repeatedly inhaled the gas, with only pleasant effects. On this occasion the gas was administered, and two teeth—the superior right first and second molars—were extracted. After the patient had become conscious, the operator went to his desk and the patient proceeded to rinse his mouth, using the first glass of water while sitting in the chair, after which he arose and walked across the room to the wash-stand, refilled his glass, and walked back to the cuspidor, which was beside the chair, and stood rinsing his mouth. This he repeated four times, occupying at least twenty minutes. During this time conversation continued uninterruptedly, the patient and operator being friends of long standing. There was not the slightest indication that he was not perfectly well. The bleeding having ceased, he laid down his napkin, with a remark upon the relief obtained from the operation, and stood before the mirror endeavoring to look at the cavities, pressing back the cheek with his right hand. As he removed his hand from his face, he drew his fingers together and said, "That hand feels numb." He was pale, and it was assumed that looking at the empty sockets of the extracted teeth had produced a feeling of faintness. He was advised to lie down on the couch, which he did unassisted. Brandy was offered to him, but by this time he was unable to articulate. He retained consciousness to some extent for perhaps twenty minutes, and died about four and a half hours afterward.

At the coroner's inquest the physicians, Drs. Girvin, Drysdale, and Hare, were unanimous in the opinion that apoplexy was the cause of death, which was not due to the inhalation of the gas. A brother of the deceased testified that the family were satisfied that death was not the result of the effects of the gas. The jury returned a verdict that death was caused by apoplexy, and exonerated the operator from all responsibility.

Respectfully,

J. D. Thomas.

Philadelphia, October 7, 1890.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

HOW MAY WE BEST UTILIZE SOCIETY MEETINGS?

BY DRS. WM. H. AND CHAS. B. ATKINSON, NEW YORK.

(Written for the Brooklyn Dental Society.)

WE meet together to-night to again pool our efforts, and to attempt to improve our methods and practices through the communion of our minds and hearts in the purpose to compass the best that may be within reach to utilize for the benefit of mankind.

Years roll by, and sometimes we may chronicle a step advanced; but too often must it be blank or even retrogressive.

It appears to be a growing fact that special departments are creeping into ours, as has been the case with other professions. Operators, surgeons, regulators, bridge-workers, plate-workers, and extractors are appearing among us as specialists, and naturally result from the lack of general clinical teaching, the short terms of studentship, the class method of instruction, and the open advice against private pupilage.

Why are post-graduate schools supported?

Special cases drift to those who undertake their care, until by degrees a specialist becomes a fact from natural predilection to a certain class of cases. Eventually this specialist feels his training to be deficient in general character, and a general course of lectures would be advantageous to him. Post-graduate schools offer facilities for the increase of practitioners educated in branches of restorative effort, and are the result of deficient clinical teaching in the education of the undergraduate.

A thorough general preparation in all branches of science and art is what is demanded, and the lazy, slipshod fashion which encourages preparation in special branches should be frowned upon.

Fully developed and completely educated men would compose a community or society such as history does not present us with. It is doubtful if it would be desirable were it possible.

Every body, of whatever sort, had its inception in the conception of a single producer, creator, inventor, or projector, and conforms to the behests of that one will in the limitations and character of being as an individual or as a member of community.

As members of a community assembled together in this society, we may best utilize its meetings by attending them and attending to them. Come with a settled purpose to hear all that is said and see all that is done, and be ready to have your say and do your do also; even though it may be but a word or an act, it may accomplish much good.

Mistaken remarks often lead to worthy discussion. Errors and failures leave a more lasting impression and benefit the committer of them, perhaps, more than his successes.

Do not fear to speak of your failures. We all have them, and need help to prevent their recurrence.

Discussion should be freely encouraged, but dissension never permitted.

Every member and guest should listen, and consider the subjects presented, and if he does not feel equal to a verbal presentment of his views at the time, think away at it, and present the result to the question-box, or to the committee on digest; it may prove just the missing link needed.

Meetings should be shorn of all business character; such matters to be in charge of a committee empowered to arrange everything of that nature, whose proceedings should be open to inspection of any member before and after any meeting, on request. Such notices as might be required could be posted on a bulletin, and announced by the chair, but not to be open to discussion.

The business committee should be part elected and part appointed. Perhaps seven members would be a proper number, of whom three would be appointed by the chair, and four elected; the appointees to serve during the official term, and those elected to serve under the first election for one, two, three, and four terms (a report each six months is suggested, making two terms for the business committee in each year, and the eventual elective service of each member two years); subsequent elections to place a committeeman for four terms, as each expired. This would provide for some experienced members being always on the business committee.

A special subject for each meeting should be announced, and at least three members selected in advance to discuss it.

A question-box should be established, whose contents, anonymous or signed, should be printed and distributed to members at least a week before each meeting. Anonymous and other replies to these could be received by the committee on digest, and a report made thereon.

The clinic report should be printed in circular form and mailed to members, and such a list as the business committee shall indicate. It should, however, appear in the Transactions in its regular order, together with such notices of a business character as the committee should decide proper for publication.

Advance copies of an important paper furnished to a number of gentlemen selected to discuss it have proved a valuable means of economizing time and concentrating discussion.

A rule to furnish five copies of each paper offered to a society, two of which would be sent to members of the president's selection, and three to names selected by the essayist, would serve a good purpose. The number could be lessened to three by the rule, and be increased at discretion ; the essayist, however, retaining the privilege of naming the greater number, one of the essayist's nominations to lead. Being a privilege of the essayist, he could waive its exercise ; but the *rule* should provide for the *prepared* discussion on the part of the society in every instance. If a paper is worthy of hearing, it should be discussed, both for the profit of the society and the courtesy due the essayist.

Earnestness is the great quality that is needed to be infused into society meetings.

The establishment of sections in our national body has not borne the fruit that it might have been expected the plan would realize, but the fault lies more in the lack of general effort than in the plan. The secretaries of the sections, especially, do hard work, but there it too often stops. Talent we have in plenty, but too frequently the paper of a talented author meets with inadequate discussion from the effort to bring too much before a limited meeting.

A yearly digest of society proceedings (in charge of a committee of five or more members, some of whom might properly be elective, similarly to the constitution of the business committee, which digest would give expression to the trend of thought and establish, up to each period, the weight of expressed opinion on subjects considered by the society) would tend to evolve a conservative line of practice on a definite basis, and open to useful argument the questions presented, until those would survive that are sufficiently well and generally held to identify them as methods to certain ends, from certain predicates, and not vague individual theories, unsupported by careful consideration and experiment.

The cost of society meetings is a matter for careful consideration.

Many times the few supply the bulk of the operating funds, particularly at the more pretentious meetings. From one point of view it is natural for those who pay to feel themselves entitled to direct the rank and file, and particularly to hold office. Is not this a stumbling-block? Large membership would reduce the necessary expense to the individual, but meetings must *attract* attendance.

One obstacle to large attendance on regular meetings is the unfortunate number of separate societies. Were these local sections of a circumscribed general body, the antagonism now observed would greatly pass away. Politics and office-seeking should find no place in a scientific society. They have nearly wrecked the American Dental Association. Cannot we join hands, cement our bonds, and pull together for a better, higher conduct of our societies?

The suggestion is offered that one hour's work in each month be applied to form a general progress fund; this fund to be in charge of the business committee.

The following would properly be embraced in society efforts, although not belonging to their regular routine:

The establishment of permanent meeting-rooms, where libraries could be accumulated and the current journals kept on file, accessible at all times to members for reference.

Our large cities, at least, should find it possible to organize a club that would furnish entertainment for visiting dentists, where they might meet confrères under such conditions as to make mutual intercourse attractive and valuable; facilities being at hand for clinical, experimental, and literary work at all times. The club library should be a bureau of information, replete with the latest presentments, and its museum of skulls, specimens, casts, etc., would supply an object-lesson long sought and hoped for.

The establishing of a strictly dental surgery ward in hospitals, to be under society control, to the charge of which efficient operators might be elected. The expense, if it proved an obstacle, might better be met by subscription for this purpose, rather than ignore this matter any longer. The colleges would benefit by the extra and valuable clinics possible, and a class of serious cases, but little comprehended as yet, might thus be followed by the student to his great advantage.

It is not intended to urge general operating. The college infirmary is a proper place for that. The dental surgery ward would properly include fractures, facial neuralgias, morbid growths of the face and mouth, artificial vela, substitution of lost and correction of deformed facial features, caries and necrosis of the bones of the face and oral cavity, diseased antra and nasal fossæ, pyorrhea alveolaris, and grave irregularities. Cases of general operative character, such as fillings, plate and bridge-work, simple abscessed teeth, irrregularities, and pyorrhea cases requiring limited *operative* treatment, might be diagnosed, but should be referred for treatment to the college infirmary.

The dental depots might perhaps find it feasible and advantageous to their interests to maintain a reading-room, where dentists might sit and read or chat over the journals, write a letter, etc.

To those who decry a dentist who patents the product of his inventive genius, the suggestion is made that they organize and accumulate a fund for the purchase of such inventions, or at least pay the expenses of their securing. This might properly be a feature of the Dental Protective Association, of which it is hoped you are all members. All members would benefit by the use of such improvements, and it would add another feature of attractiveness to its membership. This plan would require careful consideration of the method and amount of payment, and of effective protection of the inventions, and yet make them freely accessible to the profession. This last thought was well stated by Dr. Rounce in a paper on "Dental Patents," published in the *Archives* of December last, an extract from which here follows :

"The Dental Protective Association has been organized to protect its members against invalid patents now existing ; but why may not its usefulness be so extended as to protect from valid patents yet to be?

"How? Let me suggest :

"1. Let the association open books, so that any dentist originating any idea, wrinkle, or method that he will give to the profession, by sending a full description and model, if need be, he shall have full credit and all the honor ; and the same be so filed and recorded as to secure against any piracy or future patent.

"2. Let the officers of the association be empowered to purchase, for a reasonable sum, any important invention pertaining to dentistry, and patent the same for the use of the association (which should mean the whole profession).

"3. Reasonable and proper arrangements to be made with first-class manufacturers to make and furnish at reasonable prices, to whomsoever will buy, anything so patented or given.

"4. Each member to pay a yearly due to meet all expenses, and receive an annual list that shall describe and illustrate every improvement so received during the year, with full credit to the originator."

Another item for society action is to encourage periodical congresses of national character, for the special purpose of harmonizing conflicting theories and methods, that once in so often such and such may be authoritatively stated as standards for practice, with perhaps notice of others less generally supported, but of sufficient value and indorsement to be considered, secondary to these best supported presentments. This could be a special feature of the American Dental Association.

Consideration of ways and means for securing prompt publication *in full* of all matters brought before societies, subject only to curtailment by the society, is of vital interest.

The further suggestion is made to form a federation of all societies throughout the States, with the American Dental Association as the national body, each State having its State society (a part of the national body), composed of district societies, similar to the organization of the Dental Society of the State of New York ; the districts to report to their State societies at annual meetings, say two months previous to the annual meeting of the parent body (American Dental Association), at which annual meeting all State societies should report.

Should the American Dental Association and the Southern Dental Association deem it unwise to combine in such a federation in the manner named, the Southern might control its present territory, the American its proper territory, and a Western Dental Association embrace its proper district,—these three associations to combine in an American Dental Congress or Union, fulfilling the national purpose of the proposition ; this congress to meet not oftener than once in two years.

In all of these federated societies the business and other committees and special recommendations herein made would have force, and be as beneficial as in the conduct of separate societies. The federation would tend to a direction of effort and concentration of material out of which equalization of opposing views might more certainly and speedily be brought about. Organization is imperatively demanded.

Dr. Crouse has done and is doing noble work in one direction. Let us put our shoulders to the wheel, and do our part where duty calls.

MAKING GOLD CAP-CROWNS WITHOUT DIES.

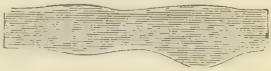
BY R. OTTOLENGUI, M.D.S., NEW YORK.

(Read before the Brooklyn Dental Society September 29, 1890.)

THERE is a limit beyond which contouring by means of filling should not be carried. If the remaining portion of a molar does not offer strong retaining shape for a filling, it is preferable to protect the root with a cap-crown. Where only a small part of the wall about a cavity is intact, even though it may seem strong there is danger that at any time it may be broken off, thus loosening any filling dependent on it for retention. There is another class of cases of which little, if anything, has been said in our text-books in relation to such treatment as I should advocate. Imagine two inferior molars, the sixth-year molar having a large posterior cavity, the twelfth-year molar similarly affected anteriorly. If the caries has extended beneath the gum line, the resulting ragged edges during the process of mastication become a source of irritation, and eventually we find the gum-tissue hypertrophied, or at least highly inflamed, sensitive, and readily made to bleed. Without entering into the treatment necessary to restore the gums to health, I would simply express the opinion that nothing is as serviceable here as two properly constructed crowns.

This may seem a strange statement when we remember that one of the strongest arguments against the use of a band-crown is that it frequently produces a diseased condition of the gum border. In my opinion there is nothing more reprehensible than a band *which is forced under the gum to any great distance.* This inevitably results where a band has parallel sides, as too frequently occurs. In constructing a band, a pattern should always be made first. If the mouth is not very wet, this may be readily accomplished with a piece of stiff writing-paper. The paper may be cut with parallel sides, carefully placed around the tooth which is to be crowned, forcing its edge under the gum at all points, and then with a pencil a line may be marked along the gum border. The pattern trimmed to this line will show the shape which should be given to the inner edge of the gold band. If the mouth is wet, use thin sheet lead. Fig. 1 shows the outlines of the blank for a band from a practical case made recently. The outer edges and the width were determined as will be described. It will be observed that a band made in this fashion would extend to, but not under, the gum. In cases, therefore, where some portion of the edge of the cavity is below the gum line it becomes necessary to adopt some additional precaution. If the border is only slightly below the gum, its outline may be marked on the paper band from within. If it is considerably below, then a post, or suitable screws, or undercuts should be made, and the cervical border raised above the line of the gum at that point by filling with amalgam before the band is fitted. The shape of the inner edge of the band, and the approximate length, having been determined, the band is cut slightly wider than will be needed. I make the bands of pure gold plate about 28 gauge. When annealed, this metal will be found almost as soft as lead. It may be readily wrapped about the tooth.

FIG. 1.



After bending the ends at right angles so that they do not quite meet on the palatal side of the tooth, with a pair of serrated pliers the two ends are grasped, and by closing the pliers the ends of the band are drawn together closely, and a tight-fitting band is the result. In soldering, the ends should lap for reasons which will be given. The band when soldered is placed over the tooth, and an examination on the inside will show whether the work has been skillfully done. If not, it should be unsoldered and refitted. The band should be moderately tight, without going under the gum at all. During the subsequent work it should never be pressed up with any force, because the soft gold will stretch, resulting in a loose-fitting crown. If care is taken in this direction, when the crown is ready for final setting it may be pressed up until the band just passes beneath the free margin of the gum, when it will be found to fit very tightly.

With the band in position the patient is directed to close the mouth, and the points in contact during occlusion are noted and trimmed away until the band *represents the full height which the crown must assume.* The next thing is to produce close contact with the adjacent teeth. This is accomplished with a pair of pliers, one nose being placed within the band, the other resting on the far side of the adjacent natural tooth. By pressure the band is made to adapt itself to the surface next to it (Fig. 2).

FIG. 2.

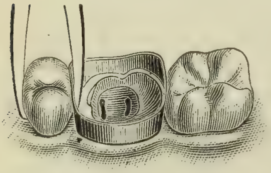


FIG. 3.

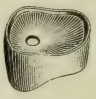


FIG. 4.

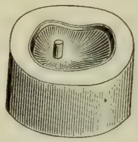
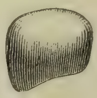


FIG. 5.



The band is now removed and laid on the bracket. Take a piece of thin platinum and lay it over the upper edge ; place the ball of the thumb on the platinum and press it gently but firmly down upon the band. This will give an impression on the platinum of the circumference of the band. The included disk of platinum being carefully cut out, on the line, will accurately fit into the band, and will have a concave surface produced by the ball of the thumb. A small hole should be punched in the platinum. Next take the band in the fingers, place the platinum in position, hold the two between the thumb and forefinger, and with gentle pressure the platinum will be forced into the band. This is seen in Fig. 3, which shows the band, the concave platinum disk in position, and the hole in the platinum. The piece is then invested, and when the investment is hardened a drill-hole is to be made in it through the little hole in the platinum ; through this is pressed a platinum post of diameter just large enough to bind as it passes through the platinum plate. Fig. 4 shows the investment, the concave platinum, the post in position, and the edge of the band. *Pure gold* is flowed on this surface until a high convex form is assumed. This is why the band was directed to be lapped, in order that the heat should not affect the solder. Fig. 5 shows the crown as it comes from the investment.

It is next placed in the mouth and ground to an occlusion, after which it is carved into proper shape with engine-burs, and polished. Fig. 6 shows a finished crown, and Fig. 7 the same in position.

Before the final setting, the post which extends through the crown is to be bent into a loop. Fig. 8 is a section through a crown and tooth, and shows how a firm attachment may be obtained, in which case little dependence would need to be placed on the band. The looped post in the crown is shown, and in this case there are two posts in the roots of a lower molar. In an upper molar a single post in the palatal root would be quite sufficient for all purposes.

In an ordinary case a crown of this kind can be completed in about one hour. Difficulties in fitting the band would lengthen the time needed.

The main advantage of this crown over one which is struck, is that it may be used in "short-bite" cases. In fact, it was first devised by me in a case where an abraded tooth was in occlusion, was very short, and very sensitive. A band was made as described, the platinum piece laid in, and in that instance burnished to the surface of the tooth to be crowned, waxed fast to the band, invested, and a thin layer of gold flowed over the platinum. This crown was then placed in position, ground to the occlusion, carved into shape, and polished. A crown struck up would not have been possible, because the thickness of the part struck up would necessarily have been above the surface of the tooth, and the crown in place would have been too long. It is very convenient to be able to correct the occlusion by grinding. Occasionally, with a perfect-fitting crown, after setting, it is found that by using an excess of cement the crown is too long. This is by no means uncommon. It is customary to grind the opposing natural tooth, but it is preferable to be able to grind the gold crown, which could not be done with a thin, hollow shell. Another point is, that, as the cusps and band are all of pure gold, there is no unseemly line of discoloration showing where solder has been used. The only solder is the speck of twenty-carat solder used in joining the ends of the band. Even here the expert may avoid solder by sweating the two surfaces together.

FIG. 6.

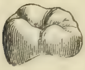


FIG. 7.

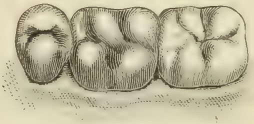
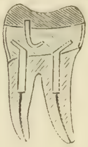


FIG. 8.



Occasionally a case presents where a superior sixth-year molar is badly decayed, but the buccal wall is intact and of good appearance. In such a case it is desirable to retain this wall for the sake of appearance. This may be done. The pattern for a band is made as before, and the band formed and fitted. The band is then trimmed away along the buccal surface, so as to expose the natural tooth at that point. Fig. 9 shows such a tooth. A platinum disk is obtained as before, and is placed within the band and along the surface of the cavity. This disk should be held in position by filling up the space above and within the band with wax. The piece is then invested as before, pure gold flowed in along the platinum, uniting it with the band, and the cusps carved out afterward. If required, a post may be used which shall pass into the root-canal. After a partial crown of this kind is set, it may be found that the adaptation along the edge of the cavity is not as perfect as it should be. This is because the shrinkage of the gold in cooling may draw up the platinum. In such cases I cut a small groove with a bur, and fill with gold. Fig. 10 shows the partial crown in position.

Fig. 9.

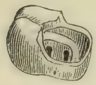
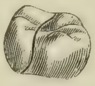


Fig. 10.



If the buccal wall is frail, and nevertheless it is desired to retain it, the cutting-edge should be ground away to a bevel with corundum and the platinum burnished over it. In this manner, when the partial crown is finished, it will extend over and protect the frail wall.

I have used this system for bicuspids, but it is preferable for molars. It is very strong, and the peculiar construction makes it almost impossible that it should become dislodged.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, October 14, 1890, in the new building of the New York Academy of Medicine, No. 17 West Forty-third street.

The president, Dr. J. F. P. Hodson, in the chair.

Dr. W. Curtis Deane read the following

Clinic Report.

A stated clinic was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street. The number in attendance was eighty-five. Dr. E. Parmly Brown, of New York, showed a new feature of his porcelain bridge-work on a case carrying four upper incisors, on the cervical surface of which was baked a platinum plate which fitted tightly against the gum.

The platinum is first struck up on metal dies as usual. The doctor claims that under such a bridge the gum will always be in a normal condition, as nothing but noble metal and porcelain is in contact with the tissues. The object of the platinum plate is to give extra strength and to reduce the labor of building body on to the teeth in preparation of the case for backing. The bridge is attached to the adjoining teeth by means of platino-iridium spurs projecting from it and anchored by gold fillings. Dr. Brown also showed his new duplex tooth-powder box, made in two parts which fit together,—a deep box below, in which the bulk of the powder is kept, and a shallow tray above, by which a small quantity of powder may be ladled up for immediate use. The doctor also showed a new crown put on the market ready for insertion, which has a doubled-tapered milled pin baked in it. Also an apparatus for wetting the corundum wheels while running the laboratory lathe. It consists of a brass water-cup with an upright arm and an adjustable spindle holding a revolving brush-wheel which is pressed against the corundum wheel while in use and is revolved by friction, thereby keeping the stone wet without spattering. . . . Dr. G. D. Wheat, of New York City, gave a clinical demonstration of the various apparatus and methods of bandaging in cases of fracture of the inferior maxilla, for temporary external use, until an interdental splint can be prepared with which to supplement the external appliance. . . . Dr. H. J. McKellops, of St. Louis, exhibited a set of plugging instruments purchased by him in London. They are finely serrated and well adapted for high-class operations. . . . Dr. Isaacson, of New York City, presented models of the teeth of a girl twelve years of age, which showed an anterior protrusion of the lower jaw about half an inch. Drs. Brown, Thayer, Walker, McKellops, and others advised the expanding of the upper jaw and retraction of the lower. . . . Dr. Young, of Boston, Mass., was represented by his assistant, Dr. Shaw, who demonstrated the use of his new local anesthetic, called "Dorsenia." He extracted an inferior left bicuspid root and a superior second bicuspid root on the right side, both of which were badly decayed and ulcerated. The operation consisted of injecting about half a drachm of the solution on both lingual and buccal surfaces of the gum. The operation, as far as evidence of no pain was concerned, was entirely successful. . . . Dr. Younger, of San Francisco, was late in arriving at the clinic, and forgot to bring with him the casts of a case of implantation. He will present them for inspection at this meeting.

The President. As an addenda to the report of the clinic committee, our friend Dr. Younger, who is present, will describe what he intended to present at the clinic this afternoon.

Dr. Younger. Mr. President, I expected to have here some casts of a case of development of the jaw which I was told the society would like to see, but the casts have been broken, one entirely demolished. I have two of them here,—one showing the original conformation of the jaw, and the other one showing its condition as the case progressed. One cast was taken before the operation was commenced, and the other when the two centrals and two crowns had been planted. You will see the difference in the size of the jaw. I will read the paper which was sent to the surgical section in Berlin, giving an account of it.

(Dr. Younger here read a description of the case.)

I wish to state that I saw an article in a paper, written by a man named Cravens, who says he saw this case in Berlin, and that these teeth were so loose that they were falling out, and that the roots of the two lower centrals were stripped to their apices. I wish merely to deny the truth of that assertion. If any of you gentlemen were in Berlin at that time and saw the case, I would like you to speak ; not for my sake, but for the sake of humanity. There were three loose teeth. I had not seen the young lady for nine months. Two or three days after I performed the last operation I tied the teeth with ligatures to a gold plate, and from that time till I saw her in Berlin was five months ; I had not seen her, and the ligatures were not removed. They were then doing good work, and I did not remove the ligatures at all ; I let it remain so that the profession could see it, and this man had not sense enough to understand the case. The young lady went to Berlin not only to let me see the teeth, but to express her gratitude for the operation made in her mouth.

Dr. Ottolengui. In the letter you refer to, the writer says that if the gold plate were to be taken out he believes the teeth would all be rattling by the time she got back to San Francisco. I think you told him you had taken the plate out already.

Dr. Younger. Yes, I removed the plate, and Dr. O'Brien and others who saw the case were surprised at the solidity of the teeth.

Dr. William Carr, of the Executive Committee, announced that accommodations had been secured in the new building of the New York Academy of Medicine for the meetings of the society during the ensuing year.

Incidents of Office Practice.

Dr. Horace Dean, of Jersey City, N. J. Mr. President, the matter I wish to speak of and to protest against is the somewhat prevalent idea that children's teeth are of no account. What brings it to my mind more particularly is the fact that a patient was brought to me a few days ago with the report that a neighboring dentist who had been consulted had said that "baby teeth" were of no account, and he did not believe in filling them. The child was less than five years of age, and suffering very much. I filled the teeth, and the little fellow is very comfortable. It seems to me that a man who has any pride in the practice of dentistry ought not to make use of such expressions to his patients ; and he should not be governed by such a low idea of a dentist's responsibility to his patient as to deliberately and willingly throw away children's teeth, with all the resulting injury in various ways, either because he does not know enough to save them or has not the patience to work for a child. There is really no branch of our practice that is so thoroughly profitable as what we call children's practice. If you can get the good will of the mother in regard to her children, you make a friend for life. It seems to me that men who claim to be dentists have a great responsibility resting upon them, and they should be a little more careful than so many are about children's teeth.

The President. This subject of Incidents of Office Practice is a very important one, and we should do it a little more justice and bring more of our daily professional life here. I do wish that more attention were given to it.

Dr. Wm. Jarvie. Mr. President, I would like to speak of a little appliance that I have had in use for the past three years, and from which I have derived as much satisfaction in operating upon pulpless teeth as from any appliance that I ever had. It is used in cases where the root-canal is somewhat restricted in circumference, and though you feel the necessity of going through the foramen, it is not safe to use any of the ordinary drills. I had such a case yesterday,—a gentleman with a lower incisor that had been worn away to the pulp, which had died, and there was an abscess at the end of the root, accompanied with much pain. I opened into the root-canal, and found that I could not go through the foramen with any of my finest broaches. But I have a drill, no thicker than a hair of one's moustache, which is made of the very finest piano-wire, and is nearly as flexible as a hair, and it will follow the tortuosities of almost any canal. With that I readily ran through to the end of the root. The obstruction may have been a particle of coagulated pus that closed the lower part of the root-canal, but whatever it was it opened readily to this drill. The instrument was made for me in Albany, by Mr. Osgood. The idea is not original with me. It is a most valuable aid in operating upon the class of teeth I have referred to. It is fastened in a fine wire holder.

Dr. George Mills. I want to show a case of implanted teeth, the operation having been performed for a patient of mine in San Francisco, but not by Dr. Younger. Dr. Younger saw the case last winter. There had been four incisors implanted in that mouth at that time, and Dr. Younger said that the lateral would probably be lost before a great while. This summer I had a letter from the patient, saying that the lateral was out. When she came back to me the central was quite loose. I took it out, and found that a great deal of absorption had taken place. The next central has begun to loosen, and will probably go in the same way.

I do not present this with any idea of speaking derogatorily of implantation generally, because I have great faith in the ultimate good results in some cases ; but it is a peculiar case. The lady has been in my hands seven years. In my judgment the implantation in this case was done under very unfavorable conditions, although the lady was very anxious to have it done. I simply present it as a case of office practice, not as belonging particularly to the method of implantation.

Dr. Dean. Mr. President, Dr. Jarvie's remarks in regard to drilling through the foramen tempt me to give a little experience of mine in that direction. I have been for a number of months treating pulpless teeth, both those that are filled with matter and those that are dry, without going through the foramen in any case. I have treated scores, I think I may say hundreds, during the last two or three years, and in no case was there a blind abscess or a fistula. I have simply cleaned out the canal as well as possible and introduced hot air, as hot as the patient could bear it. At first I used carbolic acid, then I discarded that in favor of oil of cloves, and now I use pure cinnamon oil. It is rare that a patient suffers much pain after leaving the office.

I think the trouble at the apex of the root and in the surrounding tissues comes from some cause inside of the tooth. Remove that cause, and nature will generally overcome the effects of it. Give nature a fair chance, and she will oftentimes do better than we will if we interfere with her. It may be that we should sometimes follow with peroxide of hydrogen or carbolic acid to clean out the fistula, but in my practice I have not found it necessary ; therefore I think it is unwise to complicate the case and prolong the treatment. After the tooth is comfortable, I put minute portions of copper amalgam up to the apex of the root and leave it there. I have been afraid to fill the entire canal with copper amalgam ; but I now propose to line those cavities with some sticky wax which will fill the pores of the canal, so that even in very thin teeth the amalgam will not show dark. Even in dead teeth, if you line with this wax, the amalgam does not show. I suppose that copper amalgam darkens a tooth principally because of the presence of oxygen.

Dr. Ottolengui. Mr. President, if I understand Dr. Dean, he proposes to line the walls of root-canals with wax and then put in amalgam ; but I would like to know how he would do this in such canals as Dr. Jarvie has described, which are so fine that a hair broach could not be inserted.

Dr. Dean. I would place the wax in the canal, already dry and heated from the hot air introduced, and follow it with a minute hot wire, which will melt the wax, and it will stay there. But you must put in the copper amalgam first, that there may be antiseptic effects. I have not found it produced the slightest harm. To-day a gentleman complained that it washed out ; but I think that is because it is made too dry. I do not mix my copper amalgam so dry that it is crumbly.

Another error is the supposition that ordinary amalgam will not adhere to copper amalgam. I have made dozens, perhaps hundreds, of fillings in the last two or three years in which I have placed different kinds of amalgam on top of copper amalgam, and I have not had three cases in which they separated. Sometimes I cover with ordinary amalgam, and sometimes with white alloy.

Dr. R. M. Sanger, of Orange, N. J., read a paper entitled

Conservative Dental Surgery.

The first dental operation ever performed was doubtless the extraction of an aching tooth ; but with the advance of civilization science has come to the rescue of teeth formerly doomed, so that from being the first resort, extraction is now the last. We live in an age of progress, when the ambition to reach the utmost limit of success possesses men in every branch of industry and science. The ambition is laudable, but it carries with it a possibility of over-reaching the desired end. The dental profession especially has been stimulated by this ambition to reach perfection, and it is wise to watch lest the possibility of error becomes real. It would be a grand accomplishment to save every tooth, that not one should be lost, but in the endeavor to reach this result we do well to ask ourselves from time to time whether we are not pursuing a will-o'-the-wisp.

There are dentists who have reached this state of perfection in saving teeth, if we are permitted to judge them by their own words. In our dental meetings we sometimes hear the statement made, with seeming pride, "I never extract teeth." From their stand-point Dr. Ottolengui, in his "Looking Forward," made a mistake of omission in not introducing an octogenarian who, having passed the period of usefulness in other directions, might serve in a dental clinic as a perfect model to demonstrate the number and position of the natural teeth. When a student, I looked up with something of awe to such men, believing they had reached an elevation that marked them as a sort of dental demigod, and wondered whether I should ever reach that acme of skill when I, too, should save every tooth that came under my care. It is not necessary to say that I have never reached that point ; and to-night I am convinced that the statement quoted, far from being a matter of pride, should be a most humiliating confession ; and that to know when and how to extract a tooth is an essential part of the education of every thorough dental surgeon.

The statement that men make such remarks in dental meetings as the one used, "I never extract," may seem too general upon which to found the charge of going too far in the attempt to reach absolute success, and it may be doubted whether the men who have uttered these sentiments really meant what they said. In order, therefore, that there may be no misunderstanding on this point, I will quote a paragraph printed in the DENTAL COSMOS and reprinted in the *Archives*. It is as follows :

"We often get very bad complications following neglected cases of alveolar abscess, where they follow the sinuses, and where they produce almost innumerable troubles from disturbances of the sockets of the teeth and disturbances of the entire maxillæ ; but still, in nearly all cases, there is no excuse for the extraction of the teeth."

This paragraph fully expresses the extreme view to which exception is taken as going too far. Rather might we say that in nearly all these cases a man might be excused for extracting the teeth. Indeed, if the interest of the patient was consulted rather than the desire of the operator to demonstrate what he considers an advance in treatment, it would be necessary in nearly all the cases to extract the teeth. It is my purpose to-night to show, according to my own judgment and experience, what teeth should be extracted, and especially the best time, considering the interest of the patient, to do the operation.

It would be impossible to tabulate all the conditions that call for the removal of a tooth, as the complications in other tissues (rarely twice alike) must play an important part in our diagnosis ; and I will therefore select a few typical cases to illustrate the point I wish to establish.

One of the most common complications is threatened suppuration of the connective tissues of the face. Why this condition so frequently accompanies alveolar abscess I do not propose to discuss at this time, but that it is so experience shows, and many disfigured faces bear continual proof. A patient presents himself with an abscessed tooth, bicuspid or molar. The disturbance has gone into tissues beyond the tooth ; pus has found its way into the connective tissue and threatens an external discharge. It would be to me a small matter for congratulation if by allowing such a condition to arise and work damage the tooth was saved. We are all well aware that where inflammation commences in this way in the connective tissue of the face, unless radical measures are taken to allay the difficulty, the suppurative process will speedily follow if the offending tooth is allowed to remain, while its removal will at once give an outlet to the pus, take off the external pressure, and rid the patient of the exciting cause. But, no ;

we will not extract. The ice-bag is applied ; powerful purgatives are administered ; days of suffering pass, with all the dangers of septicemia. Even the aspirator is sometimes called into play, and finally perhaps the tooth is saved for a few short years of doubtful service. Can we truly say that we have done the best for our patient in following this treatment, and that his interest has been the first consideration ? It seems to me that as dental surgeons we may fall into the error of making a part greater than the whole by using every endeavor to save the tooth *at any cost*, while the comfort and health of the patient are left out of the question. If this is right, then may we be truly classed as "tooth-carpenters," and not as physicians in any sense of the word.

The practice of leaving roots in the mouth when a denture is to be inserted is happily less frequent than in past years, but still far too common. The presence of rapidly-decomposing material in and around these roots keeps the mouth in a filthy condition, and is also detrimental to the general health, which in itself is a sufficient argument for their extraction. In addition to this, they are a prolific source of facial neuralgia, the cause of which is obscure to the physician who knows nothing of these roots. He probably inquires into the condition of the teeth in looking for the cause of the neuralgia, but when he sees a full upper and lower denture he very naturally does not look further in that direction. The patient is then obliged to swallow numerous doses of medicine, nauseous and otherwise ; the pain and suffering he endures continue ; the physician is at his wits' end ; and the dentist who left those roots in place *ought* to suffer torments from an uneasy conscience.

The wisdom-teeth also present themselves frequently as subjects for the forceps. We are all aware that these teeth when impacted also cause severe facial neuralgia, which often extends even as far as the shoulder. When the arch is already full, they are not only useless as masticators, but by pushing their way into the arch they force the other teeth out of line, or so close together that it is impossible to keep the approximating surfaces clean, and decay rapidly follows. In fact, even more serious consequences sometimes attend the efforts of these teeth to find a place for themselves.

I can never forget the anxiety with which a few years ago I watched a case of suppuration in the cheek of a very handsome young lady, lest disfigurement should follow. The patient did not come to me in the beginning of the trouble, so that I cannot give a detailed account of the first symptoms, further than to say that an impacted wisdom-tooth was the cause of the difficulty. It had been allowed to take its own course, and extensive inflammation and suppuration of the left cheek had followed. Under the advice of a physician, hot applications had been continuously used. At this stage the patient came under my care. The jaws could not be separated to allow of the introduction of a finger. Such nourishment as was taken was entirely fluid. The swelling of the cheek was great. The skin at one point was so thin that it seemed as though the confined pus would break through and escape at any moment. Calling a surgeon to my assistance, the aspirator was used with great care, the pus freely discharged, and the cavity syringed out through the needle of the aspirator. It was doubtful for several days whether the skin would not slough at one point, but finally by skillful treatment the case was brought to a happy termination. A few months later it was impossible to find a trace of the opening that had been made by the needle of the aspirator.

The tooth that had caused the trouble was lost, and the opinion formed at that time remains : that it would have been far better for the young woman to have lost every molar tooth in her head than to have had the threatened disfigurement come to pass. Who can doubt that the timely extraction of this tooth would have saved all the trouble, pain, and anxiety that were experienced? The case was a convincing demonstration to me that to attempt always to save a tooth may be the greatest folly and the worst sort of dental practice.

When teeth are affected by pyorrhea to such an extent that they are not curable, or can only be retained at risk to the other teeth, they should be removed. In fact, too often do we find the teeth of our patients suffering from disuse because of the presence of one or two teeth so tender that they cannot be used for mastication, and the food passes into the stomach without the grinding it should receive, to be followed by large doses of pepsin in the vain hope that it will do the work the teeth have left undone, and thus ward off the ever-threatening dyspepsia.

But why multiply cases? You are all aware of the very serious antral difficulties which arise from penetration of the floor of that cavity by the root of a dead molar, the removal of which is essential to a cure ; and to take time to advise the removal of teeth that have lost all blood-supply and are in a condition of true necrosis seems almost an insult to so cultivated a body of listeners as that now before me.

When we consider the ground already covered by these remarks, and allow our thought to run on to facts suggested by them, it seems conclusive that the advocate of *never extracting* is simply soaring in the clouds of fancy, and not finding rest for the sole of his foot on the hard facts of every-day dental practice ; while the gentleman who rarely finds an excuse for extracting where disturbances involving the entire maxillæ are present is talking in a most delightful way of things as they are done—in Utopia.

But, while it is important to know what teeth should be removed, it is of equal or greater importance to know when to extract. This is a point in dental practice, as in medical therapeutics or general surgery, to be well guarded. How often is success in treating disease dependent on efficient therapeutics? Two physicians, equally well informed in their profession, are practicing in the same town. One gains reputation and practice, while the other has a hard struggle to make a living. The former not only knows when certain measures in treatment should be carried out, but vigorously and promptly does what he knows to be necessary. The latter knows what should be done, but hesitates or gives half the proper dose.

How often have two surgeons, working in the wards of a hospital, under the same circumstances, left behind them widely different impressions on the minds of the house staff. The sound surgical judgment of one was equaled only by his promptness and thoroughness of execution ; the other, knowing probably what should have been done, postponed the operation until to-morrow, or made his incisions half the length and depth they should have been. So in this question of extracting teeth does the right time to extract play an important part.

A case which came under my observation several years ago will serve to illustrate my meaning so well that I will give the details. It does not involve in itself a difference of opinion between practitioners, and is therefore all the more useful, while it shows what results will follow in a certain line of treatment.

A gentleman had some molar roots in the inferior maxilla which ulcerated and started a cellular inflammation in the tissues exterior to the jaw. He consulted his physician about the swelling, and was sent by him to me. I found that pus had formed, and had made a pocket which was gradually approaching the skin. Immediate extraction of the roots was advised, but the patient objected to this and returned to his physician. An external opening was made and the pus evacuated, but in spite of treatment the abscess would not heal, and continued to discharge for three months. At the end of that time he came again to me, and the roots were extracted. In a week the abscess was nearly healed, and though finally a healthy condition was brought about, it left a bunch of cicatricial tissue on his lower jaw to disfigure his face.

This case illustrates fully my meaning as to a proper time to extract. The treatment followed in his case was unavoidable, because he was not willing to submit to the judgment of the dentist ; but we are sometimes counseled to follow the same course purposely, as the one giving every chance to save the teeth. This course I claim is unwise in either case ; to be regretted when the unwillingness of the patient makes it necessary, and to be deplored when a dentist deliberately advises it. There was evidently a time when extraction could have been done for this gentleman that would have saved the pain and disfigurement.

It should also be said that great risk to life will sometimes be incurred by failure to act at the proper time. You will recall the case of a gentleman in Brooklyn who lost his life a few years ago from hemorrhage caused by an extensive ulceration. None of us may ever meet a case of this kind, but the chance of doing so is with us if we allow these suppurative actions to spread ; and one such case would be all that any of us would care to have in the whole of our professional career.

Ordinarily a patient will take the advice of the dentist, and in cases parallel to that of the gentleman of whom I have spoken as refusing to allow the extraction, but where the patients are willing to do as they are told, the offending teeth should be removed on the first sign of trouble. Any temporary or dilatory measures, no matter what the excuse made for them, would be poor judgment and worse practice.

There is still one point I wish to speak about in closing. In my own experience I have met with a difficulty in doing what seems to me wise from a direction in which it would not be expected. The presentation of cases where great swelling is present and deep-seated pus-pockets, together with other disturbances, leads to the advice to have the exciting cause removed. But I am frequently met by the astonished question, "What, doctor, while it is swollen?" Inquiry reveals the fact that I am in conflict with the family physician, who has expressly ordered that the tooth must not be touched until the swelling is reduced. Of course this idea finds a ready champion in the patient, who is only too glad to escape the much-dreaded forceps. Such a position is so decidedly untenable from a scientific and surgical stand-point, that I have been surprised to find that not only many physicians, but some dentists, occupy it.

Discussion.

Dr. M. L. Rhein. Mr. President, perhaps it is somewhat fitting that I should open the discussion of this subject, as Dr. Sanger has omitted to state in his paper that the quotation which he gave was a portion of some remarks made by myself in response to an article read before this society by Professor Allen, of Philadelphia ; and it is to be regretted that the essayist gave such an incomplete quotation, because it left a misapprehension as to the real purport of the remarks quoted.

Dr. Sanger. Excuse me, but I gave it all,—all that was printed in the *Archives.*

Dr. Rhein. I recollect seeing that the *Archives* clipped a few lines out of the discussion printed in the DENTAL COSMOS of May, 1890, which, though true enough, and modified sufficiently by the clause, "in nearly all cases," yet failed to properly convey the sense of that discussion. Dr. Allen, in his paper that evening, took very much the same position that my friend Dr. Sanger takes this evening, advocating the extraction of teeth wholesale, and I took the floor on that occasion to protest against any such doctrine. As nearly as I can recollect, the substance of my remarks was, that it made no difference whether there was a case of alveolar abscess, or how deeply into the tissues the disease had extended, there was no necessity, *in the majority of cases*, for the extraction of the teeth, provided the dentist is possessed of the requisite skill. The trouble was not in the tooth, but around the apex of the root, in the surrounding tissue, and any simple surgical procedure which would remove the diseased portion would obliterate the cause of the trouble and cure the disease. The cases that Dr. Sanger quoted this evening, and in which he said he would resort to extraction, could have been saved, under ordinary circumstances, by amputating the end of the root and taking away the diseased tissue.

It is to be regretted that the ability of the essayist should have been wasted on this paper, for it certainly cannot be approved from an educational stand-point. Do the dental profession want an article read before them which raises a warning cry against the preservation of the natural teeth?

In his essay the doctor stated—and I suppose he meant to be very pointed toward myself—that a great many of us claim that we never extract teeth. Now if any such expression in the paper can possibly be construed in this manner, I desire to state here that I extract a number of teeth during the year; and I do not send them away to be extracted either. I extract them in my own office, unless the patient has a special desire to have nitrous oxide administered. The real fact is, the dentist must decide for himself, in each individual case, whether he is personally able to preserve such tissues in a state of health, and if not, then he should resort to extraction of the teeth; but assuming the latter, it does not follow that some other man could not have restored these parts to health and usefulness.

It is not claimed that every tooth that comes to the dentist can be saved: that is impossible; but a protest should be made against an article of this kind being sent out broadcast from the First District Dental Society as an educational article, telling young dentists that in cases of severe alveolar abscess, where the surrounding tissue is puffed up and infiltrated with pus, the teeth must necessarily be sacrificed, because a great many medical men, who are ignorant of what we have done in dentistry, have been accustomed to entering those abscesses through the face. The essayist further stated that it was unadvisable to endeavor to save teeth affected with pyorrhea that was incurable. Now, in the number of these cases that have come under my care, there have been no cases of so-called incurable pyorrhea, where all the teeth in turn would not be affected. It made no difference if you extracted the worst conditions, the remaining ones were bound to be attacked in turn. Now if Dr. Sanger maintains that every one of those teeth should be extracted and the mouth put in an edentulous condition, then the case is somewhat different from what he stated.

His statement that it was detrimental to the remaining teeth to leave the affected ones in the jaw is diametrically opposed to an experience claiming that the salvation of the remaining teeth depends to a great extent on losing none of the intervening ones. If the very loose teeth are brought into proper juxtaposition, and by any contrivance held in such a firm condition that they can readily be cleansed, the usefulness of the remaining teeth will be preserved for a much longer time than if the worst specimens were removed and the others left without adequate support.

Dr. Ottolengui. Mr. President, it seems to me that the criticism which has been made against Dr. Sanger is somewhat harsh. I do not think this society need be at all alarmed if this paper goes out. I had the pleasure of reading the paper, and I must say I was not at all shocked by any of the statements in it. Every man can argue only from his own experience, as I think Dr. Rhein has done, and if he has only seen cases where pyorrhea which was incurable would necessarily affect all the teeth, he is right in holding that opinion ; but others of us have seen cases where the pyorrhea was about an isolated tooth, and I agree with Dr. Sanger that it might be better to take out that one tooth than to imperil the rest of them by leaving it in, and having the patient call on you two or three times a month for the rest of his life.

In regard to alveolar abscess, I think Dr. Sanger's remarks are wise, especially when the abscess is pointing to the outside. I claim to be able to cure abscesses ; I think I have cured some ; but I don't remember to have cured any in the lower twelfth-year molars or wisdom-teeth. I remember to have tried it, to have collected fees for trying it, and to have extracted the teeth afterward. In such cases I think Dr. Sanger's advice is good,—to take the tooth out first, and take one fee only, which will cover the whole business.

I saw a case not long ago where a gentleman attempted to save a wisdom-tooth. The result was six months' suffering, and a fee of one hundred and fifty dollars that it cost the patient before he got it out. It seems to me that is a case where the tooth should have been extracted at the outset. There is a good portion of the gentleman's beard missing on one side of his face, which won't grow any more—unless Dr. Younger can show us a method of replanting hair. You know the hair, teeth, and nails are said to be analogous. I think that in a case where there is a chance of losing one's hair by abscess we would all agree with Dr. Sanger; at any rate it is no harm to utter a word of warning. The gentlemen who read that paper, and who have intelligence and experience, will be able to sift out the mistakes which Dr. Sanger has made, and which I confess I did not notice, and perhaps it may suggest to them to extract teeth which I cannot save any more than anybody else.

Dr. John I. Hart. Mr. President, I had the pleasure of reading Dr. Sanger's paper, and I wish to congratulate the essayist on the choice of his subject and the successful presentation of the same. My ideas coincide with his so closely that I cannot attempt to controvert, and it is simply left for me to indorse what he has said. I know not whether we are so blind that we fail to see our errors, or so egotistical that we know not that they exist. I freely admit that were it not for extremists little or no progress would be made; but the average man in his sober second thought must weigh well the language and the methods of the extremists, and accept such *cum grano salis*, and to be a successful dental surgeon he must follow the speaker's advice and practice conservative dental surgery. 'Tis but a few years since a certain system was lauded by the best element of the profession; many practitioners used it, reported satisfaction, and one almost imagined that the dental millennium had arrived. To-day we don't hear so much of the Herbst system of filling teeth. A few individuals may still practice it, but the profession as a body have found it unreliable, and consequently discarded it. Yet one searches the literature in vain to find it condemned, or a warning buoy placed over the dental shoal. Conservative dental surgery would have militated against the general adoption of any "system," "fashion," or "fad," call it what you will. About the same time no pulps were destroyed; that is, we did not start out to destroy them quickly, and as painlessly as possible. We were led to suppose that it was wiser to use no arsenic, but to amputate and cap; and we amputated and capped; and instead of painless destruction, many, I don't say all, went through a slow and lingering death, and we went through a slow and lingering condemnation at the hands of our patients. Pray don't misunderstand me, gentlemen, and imagine that before a patient is seated in my chair I prepare arsenical paste and place the same in every aching tooth, or that I treat *every* case of pulp-exposure in that way; but I think that diagnosis and prognosis play an important part in these cases, and I am free to confess that I would rather err on the side of destruction than on that of retention, still recognizing the importance of vitalized pulps. Feeling that I have exercised ordinary care in my attempts at preservation, and, after conversation with other dentists, realizing that I only assisted in making an average, I wondered that in the interest of conservative dental surgery we have heard no more on this score from the profession at large.

The paper of the evening, and many hints on associate subjects dropped by Dr. Samuel Sexton, oral surgeon to the New York Eye and Ear Infirmary, should cause us to be extremely wary of the numerous and extensive bridges that a few roots are supporting, and cause us to consider if we are not sowing a crop of trouble, the harvest to be reaped in the future, from expecting too much of nature.

Gentlemen, I would not, in the interest of conservative dentistry, stop all progress, but I do say, in the interest of that very progress we all seek, that the unhesitating indorsement before conservative trial of any given method or appliance is almost criminal.

I pass around for the consideration of the society a right inferior first molar, into the roots of which, for the enlargement of the same, a drill has evidently been introduced, with what results are apparent. This patient has been in the hands of a Philadelphia dentist, who, after perforating the root, refrained from placing a permanent filling, but the tissues naturally became irritated, inflamed, and as suppuration ensued he was compelled to perform rhizodontrypy, still persuading the patient to retain the tooth. After the patient removed to New York, and visited my office for treatment, upon probing and recognizing the difficulty I extracted. I mention this with the idea of saying that my Philadelphia brother dentist doubtless approves of enlarging root-canals, or he would not have drilled this one ; and when he goes to dental meetings and the subject is discussed, he doubtless indorses the practice, nor does he, in attempting to influence men by his successes, mention his failures. If we could only be encouraged to report our failures with our successes, then a long stride would be taken toward the desideratum, conservative dental surgery.

Dr. H. J. McKellops. This subject of the saving of teeth is one that requires a great deal of attention. Our profession is growing broader all the time, and we find that the medical profession is recognizing it. The surgeons were the first men in the medical profession to extend the right hand of fellowship to us. I have a tooth in my pocket somewhat similar to that shown by Dr. Hart. These things are likely to occur wherever such operations are attempted. Putting a hole through between the roots of a tooth comes from the attempts of those who say that they can go to the apex of the root with their drills. Not one in a hundred who pretend to can do it. I believe I am justified in saying that many diseases of the system and disturbances of the general health arise from these very cases. I remember the case of a gentleman, a fine specimen of a man and a good physician, whom I have known for twenty-five or thirty years, who came to me and said, "I have got malaria, and I am advised to go away." I looked in his mouth, and showed him the point of discharge from an affected tooth. I told him the trouble was not malaria, but blood-poisoning. He was treated constitutionally for pyemia by his brother, a physician, and the tooth, which had been filled twenty odd years, was extracted. Six months afterward he came into my office perfectly well.

It it not simply the stopping of a tooth or the putting in of a bridge that makes a dentist. A prominent merchant came into my office not long since; he had been treated for disease of the ear for about a year and a half, and it had cost him five hundred dollars. He had a set of teeth as perfect as a set of jewels. In examining his mouth I struck a wisdom-tooth, and he exclaimed, "There! my earache has come back again." I told him it was a simple case of exposure of the pulp of that tooth, the extraction of which would have saved him a heavy bill that he had been paying, as well as a great deal of pain.

The treatment of abscessed teeth requires patience and skill, and there is no doubt that many cases can be cured, and the teeth made to last for years. But no man, with the best machinery and appliances at our command, can take a drill and follow the canal of a tooth like this to the apex of the root. In attempting to follow such a canal it is impossible to tell whether it is curved to the left or to the right, or whether it is thick or thin.

Dr. Spooner. Mr. President, about five years ago a gentleman came to me and said, "I understand you can cure an abscessed tooth, and I have come to you for that purpose." I found a nicely filled tooth, the inflammation around which was very great. I took a lancet and opened the abscess high up, and it discharged profusely. I told him to come in the next day, which he did, and it was still discharging pus. I opened it again, and the same the third morning. The fourth morning the discharge had ceased. I then removed a gold filling, cleaned out the pulp-cavity, and treated it simply with chloride of zinc and alcohol. The relief was immediate, and the abscess was cured in a few days. The tooth is still in his mouth, and he has had it for five years and over since the operation.

Dr. W. H. Atkinson. I think it is a little too much to attempt to go over the ground that has been laid out with anything like profitable mental activity for the profession as a whole. What is the difficulty which strikes each one of us as being in the way of all these miserable cases? Lack of diagnostic ability on the part of those who had the cases in hand; simple want of sufficient knowledge to let the cases speak to them about how they came there and what was the best way out.

All the criticisms I have heard made by medical men and dentists have some foundation in truth. For instance, the idea of not extracting as long as the jaw is very much swollen, which was advised by the physicians. I will give you a rule for that. As soon as pus is formed and gathered into a bag, ever so small, if you can find it, open it; but do not open it before there is any pus, or when there is only a congested state, stony hard.

I have yet to see a case of alveolar abscess in an individual who had a wholesome system with a good digestion that was not "off" in the process of preparing peptones to supply blood-corpuscles.

We need, as has been suggested, a deeper knowledge than we have attained or have ever had the opportunity to acquire, before we can be masters of the situation. I would like to talk all night and pick up the specimens that have been shown and examine and criticise them, and let each one quiz my quiz.

The complaint has been made that dentists do not open their laboratories and operating-rooms to their brethren. I think it is well known that I was the apostle of such opening, and know something about it. It is a healthy thing to-day to let somebody stand over you in your work and say that he blesses it; and if he does not bless you, don't be scared. The man who gives you harsh words is the man to be taken to the mourners' bench to be prayed over. The way to investigate is to have a reason for what we do every time, and make no strokes in the darkness.

Now, there is a *pro* and *con* to every question that came up to-night. I can go through the canal of every tooth to the foramen without going through the thin, ribbon-like juncture between the two heavy portions of an inferior molar tooth. Any man should know that a first molar inferior root has always a thick, almost a separate root, both buccal and labial, and sometimes there is a thin ribbon of pulp going down, so thin that if it were extracted you could see through it. It does not necessarily follow that the men who did this [referring to specimen shown] blundered; but the man who says that it could not be made a sound tooth convicts himself of not knowing what he is about. There is no reason for not saving that tooth in the hands of a properly intelligent man. When you are satisfied that you know what to do, go ahead and do it; and when you are not satisfied, ask advice if it is within your reach. And thank God the time has come when we can ask our brethren for advice and get it. Who can I go to with the hope that I can get help?

Dr. McKellops. I would like to ask you if, after that tooth had been drilled through between the roots in that way, it could be saved?

Dr. Atkinson. Yes, sir.

Dr. McKellops. I challenge you to produce a case.

Dr. Atkinson. They have been produced.

Dr. W. C. Deane. I have one in my mouth that has been there for seven years in that condition.

The President. Will the doctor give the treatment?

Dr. Atkinson. Fill it with liquefied gutta-percha, or anything of that kind that will fill the cavity, and it will heal itself kindly. I have seen such teeth filled by gentlemen in this city, good operators. I recall a superior molar, with good roots, in which a good-sized pea of gutta-percha had been fifteen years,—a filling in the grinding-surface, and the tooth was only extracted by reason of its getting into the hands of some one who did not know enough to take out the gutta-percha filling and re-treat it. Let any gentleman who claims to be a diagnostician put his finger on that and tell me what he thinks of it.

The treatment in these cases is simply to reduce it to a healthy state. And we now have an article that is going to make you howl with delight. It is pyoktanin, literally a pus-killer. It is one of the aniline colors lately discovered. Come to my office and I will show it to you, and how to use it. In cases like those mentioned in the paper sprinkle a little of it on the abscess, and the next morning there will be no pus; or if there is any, it will only be in the part which you did not succeed in covering with this pus-killer. You will then begin to feel the joy that I experience in getting hold of something that can wipe out a multiplicity of the remedies that we have lauded so much. In using this you must be careful not to get it on your hands or on the face of the patient, as it leaves an ugly stain. But how it does what it does is something that we have yet to learn. No man even knows how food acts to nourish the body yet. Until we do know more of these things, we should do as the doctor so wisely said, study the cases closely, so as to have a good reason for whatever we do. Arrest the inflammatory action, and then fill the tooth with anything that is itself indestructible, and that is in conductivity of thermal currents as near that of the tooth itself as you can get it, and you need not extract the tooth. I have had cases that almost anyone would have pronounced hopeless. I have told you about a case where the teeth were so loose as to play back and forth, and the left superior lateral incisor so bad that it seemed foolhardy to attempt to save it. I cut the teeth down with a corundum stone until they would occlude properly, and then treated them simply in this manner. There is no ambiguity about this.

I don't want to say anything that is not profitable for every one. I love my profession, and it is my delight to show anyone exactly what I do in each case, and explain how I understand it. Pyoktanin (don't you forget it) is going to make a revolution in surgery. It has already made it in Europe, especially in Germany. I have used it in a case of epulis. With a single exception, it has not been complained of as causing pain. I applied it to an ulcer about the size of a half-dollar, and in three days it was healed. If you will consult Merck's *Bulletin*, the June and September numbers, you will get an authentic statement of it from the source of its origin. Dr. Stilling is the man who made the discovery. He says it is the greatest disinfectant and microbe-killer known, transcending bichloride of mercury and all the strongest antiseptics and disinfectants that we know anything about.

The President. Can we not use it in pulp-canals?

Dr. Atkinson. Certainly. It has been made into a solution. It is stated in the second of Dr. Stilling's papers that the solution when applied goes by preference into the deteriorated or diseased territory. When used in the eye it makes a beautiful line of demarkation, and the diseased part can be clipped off with scissors.

Dr. Rhein. Can you tell us anything about its toxic effects?

Dr. Atkinson. They say it is absolutely innoxious. In only one case that I know of has it been painful. It will penetrate anywhere, and destroy micrococci or any of the pus-generating microbes, and heal the part by first intention. When we make a surgical operation where the flaps are united by first intention, we say the reason of the wound being so healed is that there were no microbes present to set up a retrograde metamorphosis, but the tissues are glued together by coagulated lymph thrown out, and there is no scar-tissue formed at all. It is a new formation that makes the bond of union.

Dr. S. C. G. Watkins presented, on behalf of the Central Dental Association of Northern New Jersey, a petition to Congress, together with a draft of a proposed law to prohibit the issuing of patents upon operations in the mouth.

Dr. C. S. Stockton. Mr. President, I did not expect to say anything in regard to this matter, supposing that the other gentlemen from New Jersey would be here early enough to do so, but it appears that something has prevented them. This is an important matter that is before us, therefore we ask for it the consideration of the First District Dental Society of New York. We believe the time has come when operations that are performed in the mouth, or on the teeth in the mouth, should not be patented. A man may now patent a tooth, or a plate, or anything that I may wish to use, whether it is my pleasure to buy it or not; it is for sale at a price which the manufacturers or the patentee chooses to put upon it. It is their right to make their price, and I can buy it or not as I please; but as to operations in the mouth, in which humanity is deeply interested, then we object to patents, and this bill has been framed to provide that such operations shall be free for every qualified person to perform. Somebody may discover a new process for taking up an artery; it is a valuable one, and some one has a patent on it. A person meets with an accident and is bleeding to death; a surgeon comes along who is familiar with the process of taking up an artery, but he says, "I can't do it," and he has to walk away and let that man bleed to death. Why? Because that thing is patented. Now we ask that such things be free. That is all. This bill means that anything that is done in the mouth shall be free for you or for me or for anyone else who is qualified to do it. Now, when I cut off the end of a tooth, or when I whittle a little stick and drive it up into a tooth where the pulp has been or is, or when I am doing one hundred and ninety-eight other operations (I believe there are about two hundred patents on these things), I do not know but I am infringing upon the rights of somebody who has a patent on the thing. I cannot practice dentistry any day of my life but I am in danger of infringing the rights of some one. Therefore we New Jerseymen simply ask your consideration of this scheme and your aid in presenting this bill to Congress, and asking your congressmen to make it a law, in order that you and I and every man who is qualified to practice dentistry may do so without being hampered by these everlasting patents.

Dr. McKellops. Mr. President, in this question of patents I believe I am as much interested as any man who belongs to the profession which is my life and my ambition. The gentleman is a little strained when he says one may patent a method of stopping an artery. That is perfectly absurd. That is a matter of surgery, a matter of life or death, and there cannot be a patent granted upon anything of that kind; but as far as the patenting of inventions and appliances in my profession is concerned, or any other profession, I say that if a man has the brains and the ingenuity to produce something that is a great benefit to me in my profession, and which I could not produce myself, I think he should be rewarded for it, and I am willing to pay him for the privilege of using his invention. Self-protection is the first thing, gentlemen, that we have to look at. Supposing that the late Dr. Barnum had taken a patent on the rubber-dam which he invented, it would have made him a good living. He died without anything, except a little present that was given him by three or four gentlemen in the profession. I am opposed to patenting everything that comes along, but I believe in giving a man a little something for his brains and his ingenuity that have produced something useful to us. Don't grumble because some man has accomplished something better than you could do.

Dr. George Evans. Mr. President, I want to say a word on the subject of patents. While I indorse the ideas advocated by Dr. Stockton, I think we have to consider this subject from a legal point of view. I don't think any such law as that proposed can be passed by Congress, because it would be unconstitutional. There is a clause in the Constitution of the United States which says that patents shall be granted for all useful inventions and arts; and I believe dentistry is an art. I don't think Congress has the power to make such a law as this.

Dr. Rhein. Mr. President, I think the last speaker is in error. I believe there is now a clause in the Constitution which prevents the patenting of any surgical or medical treatment, and I believe it could be used to further a work of this kind, and which I think would be one of the greatest benefits that could be rendered to the profession.

A motion that the president appoint a committee to take into consideration the communication presented by Dr. Watkins was carried, and the president appointed as such committee Drs. Walker, Carr, and Perry.

Adjourned.

B. C. Nash, D.D.S., *Secretary.*

UNION DENTAL MEETING WITH THE NEW ENGLAND DENTAL SOCIETY.

The Massachusetts Dental Society, the Maine Dental Society, the New Hampshire Dental Society, the Vermont Dental Society, the Rhode Island Dental Society, the Connecticut State Dental Society, the American Academy of Dental Science, the Connecticut Valley Dental Society, Harvard Odontological Society, Boston Dental College Alumni Association, Harvard Dental Alumni Association, the Worcester Dental Society, and Boston Society for Dental Improvement held a union meeting in Berkeley Hall, Boston, October 28, 29, 30, 31. There was a large attendance at the meetings and at the clinics, which were held in the rooms of the Boston Dental College.

The convention was formally opened Tuesday evening, October 28; Dr. C. W. Clement, of Manchester, N. H., president of the New England Dental Society, in the chair.

Upon motion of Dr. S. G. Stevens, the president and secretary of the New England Dental Society were elected to preside over and act as secretary to the convention, and the presidents and secretaries of other societies represented were invited to occupy the platform as associate officers with them. After preliminary business, Dr. S. B. Bartholomew, of Springfield, read a paper on "Professional Ethics."

He defined professional ethics as a system of morals formulated out of unwritten laws that by common consent are recognized as best in associate life. Statute law protects the most necessary and greater rights that exist among men, but there are other rights that statute law does not reach that have come down to us through the generations, based on the common rights inherent in social necessities. It is well for a professional man to sit down for an hour once in a while and examine himself honestly as to his methods and practice in professional life. It is a man's defects that drop him out of the race, and these moral defects can be read in his unspoken thoughts and in his manners and methods. Our patients are powerless in our hands, and hence the necessity of a code of ethics that should be stamped on the moral motives of our profession. In closing, the speaker urged the necessity on the part of each individual to uphold the highest standard of personal and professional life to which he can attain.

Dr. H. A. Baker, of Boston, considered the paper worthy of the highest appreciation, and agreed with it entirely.

Dr. D. M. Clapp thought that it would make better men, better citizens, and better dentists of all who followed the rules of conduct which the paper advocated.

Dr. G. W. Hoffman said the subject of professional ethics was frequently discussed in dental meetings, and all agreed that the code should be lived up to. Yet, pitiful as it may seem, we all know that nine out of ten dentists break that code deliberately, frequently, and cheerfully, and the dental societies are unable to prevent it. There is no doubt the profession is in need of improvement in these respects.

Dr. L. D. Shepard, of Boston, gave an account of the Dental Section of the Tenth International Medical Congress at Berlin. His impression of the scientific work of the Dental Section was that it was not very successful nor very interesting, because there were too many languages used, and while the most scientific men, perhaps, used the English language, the proportion of those who did not was so great that they were not willing the English-speaking contingent should have as much time as the quality of their work might seem to warrant. The whole number of delegates to the Dental Section was something over three hundred. Of that number, there were from America thirty, of Americans practicing in Europe twelve, from England nineteen. There were many more who had been educated in America and who held American diplomas. Some of these could understand and speak English, and, strange as it seems, many of them could not.

The management of the Dental Section was American, and all praise is due to Dr. W. D. Miller, the efficient secretary. There was no adverse criticism of his conduct, though his position was an arduous and delicate one; he preserved concord, though the elements of discord were many.

At the first meeting of the section there was an election of honorary presidents from each country represented, and each made a speech in his own language. Thus one needed a familiarity with a dozen languages to understand what was said. From America the honorary presidents were Drs. McKellops, Talbot, Barrett, and Shepard.

There was a peculiarity about the clinics. They were all voluntary, no arrangements having been made or announced in advance. Each one who wished to clinic furnished his own patient, materials, and instruments, and from this cause the clinics were less useful and attractive than they would otherwise have been. The room which seemed to attract most of the interest of the German dentists in the clinics was the extracting room.

Socially the congress was a great success, full from the first to the last of courtesies and hospitalities. The most magnificent entertainment was, of course, the banquet to the whole congress in the Rathhaus, at which over four thousand sat down. Champagne and beer were very plentiful, and, though out of the four thousand present at least three thousand five hundred were—well, in exceedingly good spirits, yet, contrary to what would have happened in England and America, there was no quarreling nor ill nature exhibited. The whole company was very happy and good-humored, as Germans always are when under the influence of beer or wine. The dinner to the section was given in the hall, and three hundred partook. A custom new to him was introduced. After the soup was served, the president made a few remarks complimentary to a certain country, and the representative of that country rose and responded. After the fish this was repeated, and the representative of another country was heard from. This was continued during the whole dinner, and during or after each course there were speeches. It seemed a pleasant innovation, and perhaps one advantage is that the soup or fish cannot be held responsible for any ill-judged remarks.

Some adverse criticism has been made on the remarks of the American representative on this occasion, which criticism Dr. Shepard thought was not called for. The dissatisfaction had its rise among those who are practicing as distinctively *American* dentists. To guard against any unfair inference, he wished it understood that only soup and fish had been served before this address was made.

A very pleasant dinner was given by Dr. Miller to the honorary presidents. There was also a court reception, a very select affair, to which, he believed, only three dentists were invited, two of whom were Americans. The whole number of guests was only three hundred, and it was not to be expected there would be a larger proportion of dentists or Americans.

As to the scientific work, he did not think it possible that a polyglot assembly of any kind could be a complete success unless a very large proportion of the most able of those concerned talked and understood a common language. He said that among the most eminent members of the dental profession the members of the Society of American Dentists Practicing in Europe occupied very exalted positions.

SECOND DAY—*Afternoon Session.*

The convention was called to order at 3 o'clock, Dr. C. W. Clement in the chair.

Dr. Thos. Fillebrown, of Boston, read a paper on

VITALITY AS A GERMICIDE.

The essayist thought that the tendency in the last ten or fifteen years had been to ignore vital force as a factor in the treatment of disease. He did not mean a vitality represented by a full pulse or by avoirdupois, but an inherent vitality that resists deprivation and unfavorable environment and does not know how to die. Listerism is based upon the idea that inflammation and suppuration are caused by bacteria; and with the inauguration of this theory came new methods of practice in which cleanliness prevailed, and to it must be ascribed the success which is claimed for Listerism. When the idea was first advanced that bacteria were the cause of caries, he took the position that they were only at most a secondary cause,—that imperfect structure, vitiated secretions, and weak resistance were the conditions which made the work of the bacteria possible. He quoted from Professor Hamilton, of the Royal College of Surgeons, Dublin, who, while admitting that magnificent results have attended the Listerian system in surgery, yet claims that some of its most devoted adherents were abandoning parts of the system which had been regarded as essential, and without any diminution of successful results. Professor Hamilton asks, What is the immediate cause of putrefaction and of blood-poisoning, if bacteria are not? and states his belief that the cause is the resultant products of bacteria, known as ptomaïnes, which are found to be crystalline alkaloids. The action of these substances, independent of any germs, was, as taught in Senn's "Surgical Bacteriology," to induce a process of fermentation to which were attributed the most constant post-mortem appearances found in septicemic subjects,—fluidity of the blood and softening of the tissues. The conclusion from these theories, as well as from the inoculation experiments of others, was that not germs alone, but a putrescible fluid, is necessary to the production of sepsis. Bacteriologists claim that germs of fermentation and of suppuration are all about us,—in the air, in water, in the dust,—everywhere, and one might well wonder how it is there is a living animal on earth. The reason is, because healthy animal tissue starves them out, and even when artificially introduced they do not necessarily give rise to disease. Experiments had shown that when pathogenic bacteria were injected directly into the circulation of healthy rabbits they disappeared from the blood after twenty-four hours. Other carefully conducted experiments show that no microbes exist in healthy animals ; that tissues taken from healthy animals immediately after death contained no bacteria, and that when protected from contamination they undergo a retrogressive metamorphosis and possess no poisonous properties whatever. The testimony of other observers was quoted to show that putrefactive bacteria possessed the power of existence in the presence of animal cells when the latter were suffering from impairment of nutrition. The essayist further quoted from Lawson Tait the claim that no one of the infinite variety of experiments has yet demonstrated that by the admission of germs of living matter there has been produced the phenomena of the putrefactive changes which constantly result in matter which is dead. The same germs which would cause putrefactive changes in an infusion of beef-tea are admitted to wounds without producing any of the putrefactive changes caused in dead matter, —vital action placing living tissue in an altogether different category from tissue in which the phenomena of life are no longer present. The essayist contended that if the germ theorists were correct no operation could be done successfully without rigid antiseptic precautions,—that if the contact of bacteria with a wound could induce blood-poisoning, the size of the wound or the nature of the operation would make small difference in the result ; but we know they do. We are forced to the conclusion that if bacteria are the cause of much surgical mortality, the condition of the patient, the nature of the wound, the extent of the operation, and the vital power of the patient are of infinitely greater importance as factors in the result. A healthy wound, even if exposed to the air for some time, will heal by first intention if perfect coaptation of the parts is secured. Bacteria do not corrode the teeth, nor do they poison the blood. Healthy living tissue starves microbes. The life-principle must be absent from tissues to fit them for food for microbes. We must look elsewhere for the prime cause of inflammation and abscess. Vitality includes a forming and a resisting power, the building and repairing power, and a combating force against the ingress of disease. Vital force he therefore declared to be the only effective germicide.

Discussion.

Dr. R. R. Andrews said we all admit the disinfecting power of vitality, but will not admit that it follows that the micro-organisms found in dental caries do not cause the decay. Professor Miller says that he did not find the micro-organisms in healthy living teeth, but that they give off waste matter which acts upon the tooth-substance and thus destroys the tooth. So when the essayist makes the statement that micro-organisms are not the cause of decay he makes a statement that he cannot substantiate. The experiment of Dr. Miller, when he took healthy tooth-tissue and by placing it in a culture of micro-organisms found that the substance broke down exactly as it does in a carious tooth in the mouth, was proof positive that the micro-organisms did produce the decay. No one had ever produced caries out of the mouth by the use of any acid or other means before, and these experiments seem to prove conclusively that the micro-organisms are the cause of dental caries.

Dr. J. G. Templeton said that though the micro-organisms had not been shown to cause decay directly, yet the best authorities have concluded that they do cause it in some way, probably by producing acid excretions, and that the acid produced the effect while in a nascent condition. This theory was advanced by Dr. Miller, and Dr. Black had proved it. He prepared a culture-fluid which was absolutely neutral, and adding to it a few fragments of a decayed tooth in twenty-four hours it gave an acid reaction, and in forty-eight hours it reddened litmus-paper decidedly, thus showing that the addition of the decay had made the fluid acid. He would not admit that vital force cured Riggs's disease. His experience, dating back from before Riggs wrote of the disease, had been extensive, and he felt that he could prove the necessity of using remedies in many cases after removing all irritating substances from around the affected tooth.

Dr. Fillebrown said the object of his paper was to show that we do not rely as much as we might on the healing and remedial forces of nature, but depend too much upon medicinal treatment. As to the cause of dental caries, microbes are not the prime cause. If you put a tooth and the microbes together, they will produce nothing ; but if you put a little milk or meat or other substance with the tooth, then an acid will form and the decay will proceed. His experience with Riggs's disease has proven that if the irritant substance and the disorganized tissue are not removed, you may apply medicines through a syringe till the patient is gray, and the disease will persist ; and on the other hand, if you remove all irritating substances and allow drainage, nine out of every ten cases will get well.

Dr. C. N. Peirce could not agree with some points in the paper. The essayist said it is not possible for the living healthy tissue to contain living germs that could cause disease. We all know that the atmosphere we breathe, the water we drink, and the food we eat are all contaminated more or less, and all liable to be swarming with these germs. How then can the body, nourished and supported by these, escape the germs? How does it come that, when injured by a blow and the pulp becoming devitalized, a tooth will decay, and when opened into will be as offensive as anything can be?—how, unless the germs which produced the decay were in the healthy tooth-substance before the injury occurred? There has been no connection with the atmosphere; they must have come from the blood through the general circulation; the tooth has not even an abrasion. A dead tooth is never opened into without finding this condition, and in a bruise we often find abscesses appear. The germs in such cases have reached the dead blood through the circulation. We can never pay the debt we owe to Dr. Miller for what he absolutely proved,—that dental decay is caused by the presence of micro-organisms. It is true that they do not penetrate the living tissues of the teeth, but they do destroy the tissue, and this makes way for further progress. Dr. Miller was the first to produce caries outside of the mouth. He did it by placing the tooth in the necessary conditions.

Dr. Fillebrown said the questions raised by those who have spoken are the same he had raised in the paper. In the case of the decaying pulp of a dead tooth, he had asked how the micro-organisms got there. Experiments have been made which prove that they are not in the normal blood. In a bruise under ordinary conditions, if the injury is not too extensive, the effused blood will be carried off by the circulation without an abscess; and he thought the fact that an abscess does sometimes form proves that the abscess comes without the presence of micro-organisms. He had no dispute with Dr. Miller, and fully recognized the debt we owe him for his investigations.

Dr. C. T. Stockwell, to show that the micro-organisms did reach a wounded part through the circulation, quoted from an English medical journal an account of some experiments made with the view of determining the question. The account states that to avoid inflammation the farmers in certain parts of England castrate young animals by twisting the testicles, and thus parting the spermatic cord and other vessels. When this is done the parts shrink up, and there is no danger of inflammatory trouble. Certain experimenters inoculated a number of animals, which had been so operated upon, in parts of the body distant from the scrotum with matter containing micro-organisms, and in every case produced inflammation of the parts twisted off from the connection with the vital parts, thus proving that the micro-organisms or their germs were carried through the circulation to the injured parts.

Dr. Fillebrown did not claim that inoculation did not take place through the circulation, but that the micro-organisms could not live and thrive in healthy tissues. In the cases cited, if the inoculation had been performed ten days before the other operation, there would have been no result.

Dr. C. A. Brackett thought the title of the paper had an indorsement in the cases stated by the speakers. Both in the pulp of the tooth the vitality of which was destroyed by a blow, and in the twisted cord in the unbroken scrotum, we have the vitality destroyed and the dead substance present to account for the pathological condition. He failed to see any lack of harmony in the views stated. The vitality was destroyed in these cases, and the germs could not be affected by it. When a new theory, a new remedy, or a new operation or material is presented to us, we are apt to expect too much from it. Thus, when cocaine was first used in dental practice, many thought all operations in dentistry would be rendered painless, but now it is very seldom used. When the germ theory was announced, many thought the micro-organisms were directly the cause of caries. This is an extreme view. We can get some good ideas on this subject from the vegetable world. We all know that when vegetables are exposed to the air, a process of fermentation dependent upon germ action takes place. Growing fruit rarely decays, but a bruise makes it susceptible. The essayist has struck a key-note.

Dr. M. L. Rhein agreed with the essayist in regard to the influence of vitality, but thinks, notwithstanding the explanations of the last speaker, that his deductions are somewhat wrong. The removal of the irritating cause will cure some cases of what are called pyorrhea alveolaris ; but the diseased state thus cured is not really pyorrhea alveolaris, but simply a condition of inflammation and suppuration caused by the presence of these foreign substances, which being removed the trouble is cured. In real cases of pyorrhea alveolaris there is a condition of vitiated tissue dependent upon the health of the person, and in proportion to the vitality of the person the condition is more or less difficult or impossible to cure. If the vitality is good, restoration is easy ; if bad, difficult ; and if the vitality is low or runs down after the local trouble is removed, it will recur. He had seen cases where there was no irritating cause, no calcareous deposit, nothing but a serous fluid exuding upon pressure on the teeth and a cheesy mass about the roots, evidently a condition of retrogressive metamorphosis of the tissues. Despite the deduction of the essayist that no medicinal treatment is necessary, such cases can only be cured by toning up the system, and the disease will return if the tone of the system is allowed to run down.

Dr. A. F. Townsend, of Worcester, Mass., read a paper on

ABRASION OF THE TEETH,

of which the following is an abstract:

The special abrasion to which the essayist called attention was the excessive wearing away of the grinding-surface of the teeth by mastication.

In cases where the abrasion is but slight and the occluding surfaces of the teeth have the cupped appearance due to the more rapid wearing away of the softer dentine than of the enamel, he usually resorts to filling these depressions flush with the surrounding enamel, and has found the result generally satisfactory when the wear is not rapid. Sometimes the exposed dentine is acutely sensitive. In such cases the application of nitrate of silver will give temporary relief. He applies it by placing a small portion of the caustic scraped from the stick to the sensitive surface, securing it with a thin layer of cement, which the patient must be careful for a few hours not to dislodge. This treatment leaves a blackened surface, and is objectionable when this may show. Abrasions treated in this manner give a considerable period of comfort. To get more permanent results he cuts away sufficient of the dentine to allow the insertion of a gold filling.

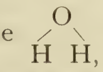
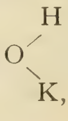
Now and then he has a case where so much abrasion has taken place as to require all his ability and ingenuity to repair. He showed a model of a case in which all the teeth were badly worn. The inferior incisors and cuspids were worn down far enough to cause the death of the pulp. In 1881 or 1882 he had capped the inferior sixth-year molars and bicuspids, also the superior sixth-year molar on the left side, to overcome the sensitiveness of these particular teeth. The operation arrested the wearing of the teeth filled, which antagonized only with those which were not filled in the upper jaw. The wear on their antagonizing teeth is excessive. The patient has the habit of gritting his teeth, and as he is about forty-five years of age will probably grit his teeth as long as he has any to grit; any repair, therefore, must be of the most substantial character. In this case he used gold foil and built it up, one tooth after the other, till he thought he had it strong enough; but the wear on the fillings is very constant, and they have frequently to be restored. In making some restorations of this character he had used gold and platinum folds, and expected greater durability. His experience had induced him to seek some more durable material than gold foil. Amalgam can be used at times, but it is not suitable for all cases, especially when the operation will show.

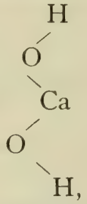
His manner of treating badly worn teeth he described as follows: Grind the tooth level upon its articulating surface, bevel the edge of the enamel, then drill two holes, one on each side, in the vicinity of the pulp to the depth of one-tenth of an inch. Then fit accurately a ferrule of pure gold to the beveled edge of the enamel. By beveling the inside edge of the ferrule he makes sure that it is a trifle longer than the tooth, and but a trifle, as he uses the ferrule to form the surface of the cap, and if it is too large it will have to be ground away in finishing. The ferrule is made to restore the normal height of the tooth. Then take No. 4 cohesive foil and fold it to thirty-two thicknesses, and anneal it in the alcohol lamp ; lay it over the end of the tooth, and press it up firmly with the finger while thrusting the pins which have been prepared through the foil into the holes made for them in the teeth. Then take a piece of beeswax about large enough to fill the ferrule, warm it slightly, and press it firmly into the ferrule. Then remove it from the tooth. The wax will hold all the pieces in proper position until invested. After the investment has hardened, wash the wax out with hot water and fill the ferrule with eighteen- or twenty-carat gold solder. When it is removed from the investment, it should be tried upon the tooth and roughly finished with corundum-stone and burnisher. It is then ready to cement into place and receive the final finish. This method is not as tiresome to patient and operator as capping with foil, and makes a very durable capping.

The following paper, by Professor Chas. Mayr, of Springfield, Mass., was read by the secretary. It was entitled

The Principles of Organic Chemistry.

Especially of late the ortho-, hydro-, azo-, hydroxyls, etc., have become abundant in medical, dental, and chemical literature. Gentlemen in active practical work have not the time to follow up the latest investigations in a branch of science not directly connected with theirs, and I would therefore present a short synopsis of organic chemistry as viewed nowadays by chemists.

If we take water as our starting-point, with the formula OH_2, or split up to make a triangle, one corner O, the other two corners H connected with a line  $\begin{array}{c} O \\ \diagup\ \diagdown \\ H\quad H, \end{array}$ we may leave off one H and obtain the supposed radical called hydroxyl, HO, which, combining with metals, produces the caustic alkalies, not the metallic oxides. When combining with hydrocarbons it produces the alcohols ; so if we put, instead of the H taken off the metal, potassium, K, we get  $O\begin{array}{l} \diagup H \\ \diagdown K, \end{array}$

which is caustic potash. Sometimes, where the metal has two attractive powers, or, as they are properly called, "valences," two hydroxyls are required to saturate one bivalence element, like calcium, which has, therefore, the constitution  which is caustic slaked lime, *not* the caustic *un*slaked lime. The caustic slaked lime might therefore be called very properly calcium bi-hydroxyl, just as water might be called hydrogen hydroxyl or hydrogen alcohol.

If we substitute a hydrocarbon compound like methyl, CH_3, for one hydrogen, we obtain the methylhydroxyl, or methyl alcohol. If we substitute ethyl, we obtain the ethyl alcohol, or the common alcohol of our legislative kindergartens. Of course, if a radical of more than one affinity or valence is combined with hydroxyl, it takes more than one hydroxyl to completely saturate that radical. Thus, it might be feared that propenyl-tri-hydroxyl would be an explosive; but it has a very harmless name in common life: it is called glycerine, and three hydroxyls are required to saturate that radical propenyl C_3H_5. The glycerine is hence also an alcohol,—propenyl alcohol. A very curious alcohol, with six hydroxyls, is what is known in the pharmacies as mannit, which is the radical manyl C_6H_8 combined with six hydroxyls. How easily the same radical, without a change of its composition, by a simple different grouping of its atoms, will become an entirely different body, may be seen in the case of the glycerine. The propenyl in the glycerine has its carbons and hydrogens so combined that it can take up three hydroxyls, but the combination C_3H_5 in the allyl has its affinities so saturated that it can take up only one hydroxyl. When glycerine is treated with hydrochloric acid, the compound di-chlor-hydrine is obtained, of the composition:

$$\begin{array}{l} CH_2Cl \\ CHOH = C_3H_5Cl_2OH. \\ CH_2Cl \end{array}$$

When chlorine is combined with allyl alcohol, the following compound is obtained:

$$\begin{array}{l} CH_2Cl \\ CHCl \quad C_3H_5Cl_2OH \\ CH_2OH, \end{array}$$

and the two substances are entirely different, although the sum total of their elements is exactly identical.

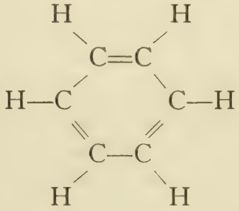
Thus, the radical butyl from butyl alcohol, C_4H_9, may be composed of CH_3CH_2, and CH in four different manners. The first is $CH_2CH_2CH_2CH_3$, and is called normal butyl. The second of the radical, CH_3CH_2CH,CH_3 is iso-butyl alcohol, or fermentative butyl alcohol. The third, $CH_3CH_2CH_3CH_2$, is the secondary butyl alcohol, or ethyl-methyl carbinol. The carbinol is another term in organic chemistry to indicate combination with the radical COH, or CHOH.

The fourth, tertiary butyl alcohol, or tri-methyl carbinol, contains the radical $CH_3CH_3CH_3$, which substitutes 3H in the radical carbinol, which is originally COHO, and is tri-valent.

Thus, there exist propyl and iso-propyl alcohols. Of the amyl alcohol $C_5H_{11}O$, there exist three varieties, etc.

If in water (OH_2) both Hs are substituted by the same radical, or, in inorganic chemistry, by the same metal, we get the plain oxides, called in inorganic chemistry ether. Thus, as you will see, water is not only hydrogen hydroxyl, hydrogen alcohol; it is also hydrogen oxide and hydrogen ether.

Another interesting group is that which belongs to the aromatic series, especially to the radical benzol, C_6H_6, supposed to be grouped in this manner:



If we substitute one hydrogen in this benzol, which is not the ordinary substance sold as benzine, by OH we get a substance very well known to dentists, namely, carbolic acid, which is, therefore, C_6H_5OH. If we substitute one hydrogen by the radical of ammonia, NH_2 (ammonia is NH_3, and the supposed metal of ammonia, the ammonium, is NH_4), for H, we obtain $C_6H_5NH_2$, which is aniline.

The manufacture of aniline from benzol would appear very easy from this statement, but in reality a circuitous road has to be taken to get rid of the excessive H in NH_3 and in C_6H_6. The benzol is first transformed into nitro-benzol by treatment with nitric acid,—a very aromatic substance which smells like oil of bitter almonds. By the treatment of this nitro-benzol with acetic acid and iron, the group NO_2 (which has taken the place of one H in the benzol) is so decomposed that both O's are taken up by the iron, and the nascent hydrogen is substituted in the place of one O.

Under "nascent hydrogen" is understood the nitrogen at the moment of its generation, when it is perhaps in the liquefied form.

Another interesting group is that of organic alkalies. They are ammonias in which one or more hydrogens are substituted by organic radicals. We have the monamines, diamines, and triamines.

In the monamines one hydrogen is substituted by a radical; in the diamines two, and in the triamines three. They may all be different radicals; thus, aniline is called phenylamine if the radical C_6H_5 is called phenyl—whence the term phenyl alcohol for carbolic acid; because when viewed from this aspect carbolic acid is again water, in which one H is substituted by the radical phenyl C_6H_5.

Evening Session.

The convention was called to order at eight o'clock, Dr. W. E. Page in the chair.

Babson S. Ladd, Esq., of Boston, read a paper on

Some of the Rights and Duties of Dentists at Common Law.

Mr. Ladd prefaced his remarks with the statement that in all employments demanding special skill and knowledge on the part of persons given to their pursuit, whether such employments were classed as professional or mechanical, the general principles of law defining the civil responsibilities and duties of persons thus employed are the same.

The law requires a dentist in treating a patient to exercise that reasonable degree of skill, coupled with learning and experience, which is ordinarily possessed by others of the dental profession. Statutes regulating the practice of dentistry simply operate to exclude from practice those persons (quacks and charlatans, the courts have called them) who are incapable, from lack of the learning and experience ordinarily possessed by dental practitioners, of treating patients with a reasonable degree of skill. All this is for the protection of the public. The common law, as distinct from statute law, is abundantly able to protect individual members of the community against incapable medical practitioners. No statute is required for this purpose. He quoted from a judicial opinion of approved authority: "Anyone who assumes to be qualified for the exercise of any profession, art, or vocation is responsible for any damage that may result to those who employ him from the want of the necessary and proper knowledge, skill, and science which such calling demands. This rule applies to a physician. He impliedly contracts with those who employ him that he has such skill, science, and information as will enable him properly and judiciously to perform the duties of his calling. If he should be deficient in these respects he has violated his contract, and must account in damages for any malpractice by which those who employ him sustain injury. This is the general rule applicable to all professions and avocations in which men are employed to act for others in any particular department of business requiring skill, art, or science. The law does not, however, require the highest degree of skill and science, but only such reasonable degree as will enable the person safely and discreetly to discharge the duties assumed. The failure of a course of treatment is not by any means conclusive of that want of professional skill by the practitioner ; such a rule would be harsh and unreasonable in application to any art or profession, and endanger the most faithful and best informed.''

Mr. Ladd referred, as illustrating the application of this rule, to a case tried at Philadelphia some years ago, in which suit was instituted against a dentist who had administered chloroform to a patient who a few days subsequently was afflicted with paralysis. The question was whether the paralysis was attributable to the dentist's having administered chloroform, in view of facts subsequently stated, but of which the dentist was ignorant. In passing on this question the judge said it was material for the jury to consider whether he had displayed sufficient skill and knowledge of his profession, and concerning this the court said, ''If a medical practitioner resorts to the acknowledged proper sources of information ; if he sits at the feet of masters of high reputation, and does as they have taught him, he has done his duty, and should not be made amenable for the evils that may result from errors in the instruction that he has received. . . . He who acts according to the best known authority is a skillful practitioner.'' And still further, in dealing with the question whether, the patient being from previous circumstances predisposed to paralysis, the dentist had been negligent in administering chloroform, the jury was instructed that the defendant was not answerable for consequences which were not the ordinary or probable result of what he did. He was only bound to look for what was natural and probable. The jury found for the defendant.

This case well illustrates how important is the qualification already stated, that the failure of professional treatment should not be taken as conclusively showing the want of professional skill in the practitioner.

The essayist quoted other cases, with the instructions of the court to the jury, in support of the ideas thus set forth. He, however, called attention to the fact that the standard of professional skill is never stationary ; it must be kept up to the constant advance of professional knowledge. In judging of the degree of skill exercised in a given case, regard is to be had to the advanced state of the profession at the time. The patient is entitled to the benefit of increased light. The physician is bound to keep up to the improvements of the day. But in keeping up with the march of the profession, he advised caution in experimental practice, for if the experiment in any particular case is rash, and contrary to the known rule and usage of the profession, damages for malpractice might be claimed, no matter what the general skill may be. The adoption of new remedies and modes of treatment is admissible only when their benefits have been demonstrated, or when, from the necessity of the case, the surgeon or physician must be left to the exercise of his own skill and experience. It does not avail that a patient covenants not to sue for damages in the event of untoward results from treatment. A special contract does not exempt from responsibility for either not doing or not doing well. With or without such a bond the physician may be prosecuted for malpractice. Nor does it lessen the legal responsibility to claim that services were gratuitous.

The essayist also called attention to the law which made every employer, principal, or master liable to make compensation for damages, consequential from his employing an unskillful or negligent servant or agent. A dental student is such servant or agent. The New Jersey dental statute, passed during the current year, provides that "No student shall perform any operation upon the mouth or jaw of any person save in the presence and under the supervision of his preceptor." Although imposing upon the student who violates this provision the penalty of revocation of his registration as a student, and such further penalty as is provided for unlawful practice of dentistry in New Jersey, this statute places the student under a wholesome restraint that must lessen the preceptor's actual risk, without, however, relieving him in any degree from the burden of duty imposed upon him by the common law.

The essayist next took up the question of the status of dentists, referring to the reports that in the recent census enumeration they were classed as manufacturers and not as professional men, and quoted from several judicial opinions to show that, as the practice of dentistry required a knowledge of the physiology of the human system, the relations of its various parts and their mutual dependence, its practitioners were clearly entitled to be classed among the learned professions.

Mr. Ladd then discussed the question of remuneration for services rendered by a dentist, and said that in the absence of any agreement to pay for dental services performed, the law assumes an implied promise to pay as much as the dentist deserves to have, which amount will be governed, as it seemed to him, by the scale of charges in general use among dentists of good standing engaged in practice in the locality where the cause of action happens to arise. When the scale of charges is printed on the dentist's card, the patient to whom such card is given obviously has the right to insist that the charges for services rendered him be assessed by the scale in question. The law simply requires that the fees be reasonable. All services are not of equal value. Those who can render them the most skillfully should receive reward in proportion. Every man should be rewarded according to the degree of his perfection in his own art, and the law will uphold them in charges corresponding to their recognized efficiency as masters. A professional man, however, is not justified in arbitrarily advancing his charges, especially with patients who have the right to assume, in the absence of notice to the contrary, that services will be rendered at the rates substantially which they have formerly been charged. On the other hand, the dentist cannot exact compensation for professional services necessitated by his own lack of skill and care. It is the duty of a patient to co-operate with his professional adviser, and to conform to instructions. Failing to do this, he cannot hold his adviser responsible. No man may take advantage of his own wrong, or charge his misfortunes to the account of another.

The essayist concluded his paper by a consideration of the law in its application to professional men as witnesses in the trial of cases in which they may be called as experts,—that is, to interpret facts in the light of their professional knowledge and experience,—and said that, although every man was bound to obey the subpœna of the court, and to testify as an ordinary witness to facts, he could not, according to the best authorities, be compelled to testify as an expert.

The discussion of this paper took the form of relations by several dentists of their experience, as jurors, witnesses, and defendants in malpractice suits.

Dr. George Evans, of New York, said that some years ago in New York city a woman sued a dentist, claiming that her jaw had been broken by the careless extraction of a tooth. She obtained a verdict for twelve hundred dollars. Since that time many suits had been instituted by men and women of doubtful character, who were encouraged by disreputable lawyers. In the great majority of these cases the dentists had thought it best to settle the case out of court on the best terms they could get, rather than suffer the loss of time and the annoyance and expense of fighting it through the courts. A local defense society of dentists should be organized to examine into suits brought against the members, and if the charge should be unjust, the association should defend at its own expense. While every dentist has to fight his own battles without aid, he will usually find it cheaper to compromise even though he feels there is no justice in the claim for damages.

(To be continued.)

UNION CONVENTION OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

THE fifth Union Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York was held in the Assembly Room of the New Osburn House, Rochester, N. Y., on Tuesday, Wednesday, and Thursday, October 28, 29, and 30, 1890.

FIRST DAY—*Morning Session.*

The convention was called to order by Dr. Frank French, of Rochester, at 2 P.M.

Dr. R. H. Hofheinz, president of the Seventh District, in which the convention was held, delivered an address of welcome, which was admirable both in matter and delivery. These union gatherings, he said, contributed to good-fellowship and to that interchange of ideas which increased their knowledge and made the profession more cosmopolitan. What was the knowledge of one became, through this interchange, the knowledge of all. Though they might still be far from their ideal standard, this association would help to bring them nearer to that standard. They were not assembled as politicians, to concoct schemes for the next campaign, but in the sacred ties of professional brotherhood. They hoped to do something to elevate the standard of dentistry. Colleges and educational institutions are doing much, but these meetings are surely powerful animators to their continued development. This is why they were welcomed as brethren, if they came grounded in high and worthy principles. These meetings are not held in vain, for they knit that bond of professional brotherhood which gives to professional life its principal adornment.

The attention of the convention was then occupied with the reading of the minutes of the last meeting, and the routine business of reports of committees.

The Business Committee reported that they had arranged for a banquet on Wednesday evening.

Drs. W. H. Atkinson and W. W. Walker, of New York city, and Dr. L. S. Straw, of Newburg, guests, were invited to participate in the proceedings.

The first essayist was Dr. George B. Snow, of Buffalo, who addressed the convention on the subject of a "New Method of Packing and Vulcanizing Rubber." The address presented substantially the matter contributed to our "Hints and Queries" department for November, which need not be repeated here.

Dr. S. B. Palmer, of Syracuse, read an essay, of which the following is an abstract, on the subject of

CHEMISTRY IN DENTAL PRACTICE.

Dentistry as a profession is of recent origin ; the recollections of some still in practice antedate the period of its birth. The profession is, however, divided into two grades : those who graduated after a few months or years from a private office and commenced practice under a certificate of qualification issued by their preceptors, and those of recent years who possess the degree of D.D.S., or some other equally valid title. Practice demonstrates that there is no visible line between them. Desire for advancement, with push and energy, have enabled a few, with limited advantages, to keep in rank with those of better opportunities who are not thus stimulated. Dental law now regulates the practice, but the law is no hindrance to those who were in practice previous to its enactments.

While we find the two grades one in practice and one in action, they are not equal, nor can private study ever make them so. This distinction is most apparent in their relative knowledge of chemistry, which is rarely attained from private study, and is one of the requirements in a college course. It would be a waste of time to attempt to teach the rudiments of an inexhaustible science in one short paper, while advanced teaching would be of use only to those who have pursued the study. Even among those of largest opportunities, we find dentists who took chemistry much like the theological student did, because it was one of the requisites in his scientific course. On being asked by the professor what he would administer to a person who had taken oxalic acid, he after some hesitation replied, "I would administer the sacrament."

All over the land dentists are administering the sacrament to aching teeth, simply from lack of chemical knowledge. Chemistry teaches many things which we all know and practice without having obtained the knowledge from study. There are many facts of importance founded upon this science which should be brought out in clinical instruction. Chemistry teaches that the elementary substances number nearly seventy. By elementary substance we mean matter which cannot be divided or resolved into another substance. Possibly some of these may hereafter be divided, and new ones will be added to the list.

Each element has what is called a proportional number or atomic weight. The same elementary substances frequently combine with one another in several different proportions, but by weight the proportions are the same as those numbers. Hydrogen, being the lightest substance, is taken as the unit. Oxygen has an atomic weight of 16. In addition to the notation signifying weight, each element is represented by the use of the initial letters of the Latin name of the elementary substance to represent that unit of each element which we call an atom.

Thus, O represents one atom of oxygen, N one atom of nitrogen, C one atom of carbon. These symbols represent a definite weight that is the weight of the atom as related to hydrogen. O stands for 16, because an atom of oxygen is sixteen times heavier than one of hydrogen ; C stands for 12, as an atom of carbon is twelve times the weight of one of hydrogen. Figures are used above or below the symbols to indicate multiples : thus, O_2 means two atoms of oxygen, or in weight 32 ; C_6 means six atoms of carbon, or 72.

Those who have not made chemistry a study are apt to confound atoms and molecules. This is a great mistake, as the atom represents the unit of an elementary substance, while a molecule signifies the smallest particle into which any substance is capable of being subdivided by physical processes without losing its identity as such. It should be borne in mind that chemical combination always takes place in definite proportions by weight. Eight grains of oxygen combine with exactly one grain of hydrogen, any excess of either gas remaining unchanged. In the case of water, where two atoms of hydrogen combine with one atom of oxygen, each atom of oxygen weighs sixteen times as much as an atom of hydrogen. The two substances combine in the proportion of 2:16 or 1:8, as stated above. Next we must understand something of affinity before we can make an application of chemistry to dental practice, which is the sole object of this paper. Chemical affinity is the name given to the force which unites the atoms of chemical elements. Of its real nature we know as little as we do of electricity. The following definition will serve our purpose :

"Chemical affinity is that force which binds together atoms of unlike kinds of matter in such an intimate manner that the properties of the elements are lost and a compound of new properties is produced."

New properties in the compound formed is a distinguishing result of the action of chemical affinity. The force of affinity is heightened, modified, or suspended by various causes, of which heat is most potent and available. Thus, carbonic acid and lime unite strongly at common temperatures, forming marble or limestone, but at a red heat their affinity is annihilated and they separate. On the other hand, potash and sand will not actively combine at ordinary temperatures, while at a white heat, at which they are melted, combination takes place and glass is formed. Light also influences affinity, promoting composition and decomposition. If chlorine and hydrogen gases be mixed in the dark they will not unite, but exposed to light they combine at once. In photography numerous examples of the effects of light upon affinity may be witnessed. Electricity is also a potent agent in decomposition of compounds. Cohesion differs from affinity in that this force holds together the molecules of bodies whether elementary or compound.

Heat is the most important agent in modifying cohesion. Heat melts, or renders metals liquid ; on cooling they become solids by cohesion. Gold foil becomes a solid body at ordinary temperature, when manipulated into a filling. In a state of fusion metals are mixed to form alloys ; cohesion holds the compound together. As an illustration of chemical affinity, if iron and sulphur are burned together, fifty-six grains of iron combine with thirty-two grains of sulphur, and we call the new product sulphide of iron. The only evidence we have that each element is there is that the weight of the compound is exactly equal to the weight of both substances uncombined. This force holds together matter in the gaseous, fluid, or solid state. Ice is a solid ; water a fluid ; steam a vapor, not strictly a gas.

It is as difficult to draw a line between cohesion and adhesion as it is to distinguish between adhesion and capillary attraction, or even mechanical unions. Fluids are attracted to hard surfaces, and rise above their level in small tubes. Glue unites two pieces of wood, paste unites paper, pitch sticks to the fingers.

We have thus far defined some of the forces connected with chemical science. Perhaps some will ask, What has all this to do with dental chemistry? Everything. Chemical science teaches the dentist that dental caries is a result from "external chemical action ; it detects the causes, demonstrates their action, defines their origin, suggests the remedies, and prepares them to our hand." It is our guide in the selection of the filling-material most compatible with the condition of the teeth. It determines the nature of the saliva, its action upon the metals used in the mouth, and as plainly determines the consequences of the reaction incident thereto upon the teeth filled. It affords practical knowledge to those who understand and heed its teachings, while those who are ignorant of it are left to obtain knowledge by empirical practice, or to follow the teachings of others who are perhaps as ignorant of chemistry as themselves. Its fundamental principles are fixed and positive, and are the foundation of all intelligent procedures in iron, steel, and smelting works, in assaying, manufacturing of salts, drugs, etc. These all require an expert in the special department. The practicing physician and surgeon must be a chemist. All successful industries are conducted in harmony with chemical laws, or they would not be successful, but such knowledge is frequently obtained from experiments or teachers without a knowledge of the principles of the science, and in such case changes in methods cannot be made with any certainty of results. There is no chemical laboratory wherein such important work is done with such a variety of elements, in such unknown quantities, at such varying temperatures, and in such unclean apartments as in the oral cavity. He knew of no occupation that more needs the helps which chemistry offers, and certainly of none so poorly supplied with these helps, as dentistry. Progress in dental chemistry must be looked for from the teachings of a practical dental chemist, who best knows the demands and can best furnish the supply. Such an one witnessing an effect, discovers the cause and provides the remedy.

Electro-chemistry accounts for the phenomena of change in the composition of matter witnessed in relation to the various phases of the electric currents. The resistance of the air between the positive clouds and the negative earth is overcome by the energy of electricity, which passes from the former to the latter with power according to the distance to be overcome. The vivid flash, the deafening roar, the rending of forest-trees, the firing of buildings, are the results of electrical energy. In a less degree we witness the energy of the same force as it is sent out from the dynamo upon slender conductors. In its passage through the air from one carbon candle to the other a city is lighted; when turned into mechanical force, mills are run and tram-cars traverse the streets. Still lower in degree, by the same force from the fluid battery messages are sent around the globe, and the human voice is conveyed hundreds of miles. If the current is made to pass through water, decomposition is the result; the hydrogen and oxygen gases thus liberated being ready to reunite with the energy which caused their separation. Still lower in the scale of decomposition this force is silently effectual in its work where various compounds are brought together in connection with heat and moisture, and its presence may be rendered visible by the galvanometer. This latter condition is that which exists in the oral cavity,—teeth decay near the gums; fillings are undermined at the cervical border; zinc phosphates decompose at the same point; pivoted roots decay beneath the crowns of porcelain; poorly calcified teeth decay beneath gold fillings; amalgam fillings roughen, blacken, and become smaller on the surface in contact with the dentine in the same class of teeth. Vulcanizers become thin at the water-line, posts decay at the surface of the ground,—all from the energy spent at the line of oxidation or decomposition as an effect of currents from positive and negative elements. As already described, the bonds of affinity are sundered and new compounds formed, all according to positive laws known and taught in electro-chemistry.

The knowledge afforded by chemical science is exceedingly interesting in its relation to amalgam. Amalgam plugs are not crystalline, homogeneous masses of matter, but a mass of two compounds combined and held together by cohesive attraction. One consists of the cuttings, filings, or shavings of alloy, with the addition of the mercury which penetrates the minute portions of alloy, and the other of the mercury which fills the spaces between the cuttings and such portions of the alloy as the mercury takes from the surfaces of the filings. Thus, the setting of amalgam consists in a portion of the mercury being taken up by the alloy, while the remainder is hardened by taking from the alloy. There is a molecular change which goes on during the process of complete hardening. An amalgam plug is not an alloy of the metals used in its composition, as it would be if subjected to a heat nearly equal to that which would volatilize mercury; at such a temperature the molecules would have free action, and the mass might be termed an alloy. Every amalgam plug which is composed of alloy and mercury mixed at the usual temperature is a compound made up of positive and negative elements, both elements being composed of the same metals but widely different in proportions. This we have repeatedly demonstrated by the galvanometer in the following manner: Let the conductors leading from a galvanometer terminate in platinum points, or in one point and one small plate. Face one side of an amalgam filling and polish it finely; flatten the opposite side and lay it upon the platinum plate; wet the polished surface with weak acid, and slowly draw the platinum needle-point across it. It will be seen that the needle of the instrument cannot change its polarity quick enough, nothing can be seen upon the surface of the metal, but the current is reversed as often as the point passes from the cutting of alloy to the space between which contains more mercury. This is a scientific fact, and one that renders even non-shrinking amalgam plugs unreliable in poorly calcified teeth. Year after year new alloys are offered with assurance that all difficulties have been overcome. They do not shrink, nor discolor the dentine, but still decay goes on around the fillings. We take them out, and find the inner surface black and roughened. Chemistry teaches that the moisture in the dentine has set up a galvanic action between the elements in the filling; that the positive portions are decomposed; that though the negative predominance may have held the filling intact, yet it had become smaller and is said to have shrunk. We are also taught another lesson: The chemical action which decomposes the plug also decomposes the fluids which moisten it, and thus furnishes the acid to act upon the dentinal walls of the cavity.

We are taught also that the oxide of copper, sulphide of silver, etc., compensate for the waste which occurs in the decomposition of the plug and thus prevent shrinkage and decomposition of dentine. This is true. We give the teachings of the two conditions.

We have another lesson respecting the spheroidal conditions of amalgam plugs, as we generally see them in crown cavities of molars. His own observations from a chemical stand-point had led him to quite different conclusions from those usually set forth in explanation. Crown cavities are usually filled more than flush; that is, the enamel around the cavity is usually beveled or countersunk, the plug generally having the appearance of a wood-screw head, and is somewhat larger than the filling. When this occurs, the thin edges of the filling rest upon enamel. The action we have already described at once sets in ; the thin edges give way with twice the rapidity that the flat center surface does, as there is an exposure to the edges between the enamel and the filling as well as upon the outer surface. It should be remembered that an amalgam filling with an enlarged surface cannot be packed upon smooth enamel so as to exclude moisture. Thus the action is twice as much upon the projection as upon the body of the filling ; consequently the overlapping portions are decomposed, and we see a "bulged" filling, as it is called. Almost any amalgam filling in the crown of a molar could be given that appearance by the use of the bur without exposing any portion of dentine. The tendency of amalgam fillings to be reduced by oxidation is greatly augmented by galvanic action between the elements incorporated in the mass. To illustrate, according to Faraday one hundred parts of steel alloyed with one of platinum are dissolved with effervescence by diluted sulphuric acid too weak to act with perceptible energy on common steel. The reason given is that the platinum renders the steel positive. This principle is also illustrated in the action of the same acid upon commercial zinc, only that the polarity is reversed. The presence of iron in zinc battery plates permits local action by which the zinc is soon oxidized, the iron becoming the negative element.

The oral cavity is an electro-chemical laboratory. This fact should determine the character of operations ; and those who perform such operations should be instructed in this branch of science. Who are the teachers ? Out of a long list of professors of chemistry that are engaged in dental schools, only four are graduates of dentistry ; the large proportion are M.D.'s, or medical men who teach from the medical standpoint.

So far as he had observed, none of the text-books on dental chemistry embody the ideas set forth in this paper. The chair of operative dentistry might as well be filled by a general surgeon as the chair of chemistry in a dental college by one who is merely a professor of general chemistry. Medical schools are supplied with the character of teaching they need ; dentistry requires all that, and more, to meet the needs of dental practice. It is evident that dental progress must come from within ; the medical profession cannot supply our needs. Practical dentists should write our text-books, and dentists should teach dental chemistry in dental colleges. How can one teach what he does not know ?

Discussion.

Dr. Charles T. Howard, Rochester, in opening the discussion, said it was with timidity that he approached the subject of chemistry. Its field was so vast and its conclusions so far-reaching that it was well to go slow. The paper just read ranged from the fundamental laws of chemistry to the most profound theories. It spoke of atomic weight, molecular weight, affinity, cohesion, adhesion, and electricity as a decomposer of compounds. Perhaps a little more was needed to be said on the fundamental principles of chemistry for the better consideration of the latter part of the paper. We readily grasp the meaning of the words grains, ounces, and pounds, because they are tangible and convey the idea of fixed values in themselves ; but in atomic and molecular weight, and also specific gravity, we have an expression of relative values, and many even among professional men failed to grasp their true meaning. Atomic weight is the weight of an element compared with hydrogen as the standard (hydrogen being the unit or one). A cubic foot of hydrogen weighs a certain amount ; a cubic foot of oxygen weighs sixteen times that amount. So sixteen is the atomic weight of oxygen. It applies only to an element, and not to a compound. It is the comparative weight of equal volumes, and not the absolute weight of any amount of an element. Molecular weight applies to compounds, and is the sum of the atomic weights of the elements composing the compound. In regard to chemical affinities, we must keep in mind their relative polarization to intelligently discuss both chemical combination and decomposition, especially where electricity plays any part in the latter. Elements are denominated positive and negative from their being given off, the former at the negative and the latter at the positive pole of the battery in the process of electrolysis, which is electro-chemical analysis. Some of the elements appear at times to change their polarity. As a rule, elements of the most pronounced opposite polarity combine with the greatest strength. Elements differ, as the essayist said, in their units of attraction for each other. Those having one unit of attraction, like hydrogen, are called monads ; those having two units, like oxygen, are called dyads ; those having three units, like aluminum and gold, are called triads, and so on. Some of them also have other units of attraction than those of the class in which they are placed. Compounds having any elements with their units of attraction not satisfied are unstable and liable to change.

Let us draw a lesson from this applicable to dentistry. Oxygen has two units of attraction or affinities ; hydrogen has one unit. The two combine readily, requiring two volumes of hydrogen to one of oxygen to make a stable compound. Standing with my two arms extended, let me represent oxygen, each arm being a unit of attraction. If one hand grasps all the hydrogen it is able to hold, that affinity becomes satisfied. I am now converted into hydroxyl, or which when united to another hydroxyl group becomes peroxide of hydrogen. The other arm still represents an unsatisfied unit of affinity. This makes peroxide of hydrogen an unstable compound, and therefore it must be kept very closely confined. When more hydrogen is supplied, the unsatisfied affinity becomes satisfied, and we then have two parts of hydrogen to one of oxygen, with all the affinities satisfied. This makes the very stable compound familiar to us as water. So if your peroxide of hydrogen is not carefully guarded you will in time be using water, and wonder why its effect is not greater.

The essayist spoke of cohesion and adhesion. These terms are so often misused, even in our conventions, that it seems well, more for enlightenment than discussion, to say that cohesion is the force that holds a body of similar substance together, while adhesion is the force that holds bodies of dissimilar substances together. There is no such thing as adhesive gold. Gold does not adhere to the walls of a cavity.

As to steam not being a gas: Physically it is as much so as nitrous oxide when relieved from the pressure of the cylinder.

The essayist's position that electricity plays a very important part in the destruction of tooth-substance around fillings, raised a point where Dr. Howard would probably differ with him, but he was not ready to draw definite conclusions. A very essential thing in electrolysis is that compounds acted upon should be in solution. While the mouth is positively known to be such a chemical laboratory and microbe-culturist, it seems best to attribute these processes of destruction to those causes rather than to electro-chemistry, at least until more is known of the latter.

Chemical knowledge is important to us as dentists. Plants are now known to secure nitrogen from the nitrogen being converted into soluble nitrates by microbes, so that the farmer to secure the best results must have conditions under which the microbe will thrive, and he is therefore the most extensive microbe-culturist on earth. Probably ninety per cent. of farmers are ignorant of the first principles of chemistry and of the growth of microbes. But to be in the front rank knowledge of these things is essential. The only difference between the farmer and the dentist in this respect is that the former is engaged in growing microbes, while the dentist is killing them. It is important that we have a full knowledge of our occupation, and chemistry is one great essential.

The paper spoke of dental chemists as teachers of the dental student. Dr. Howard could not fully assent to that in the teaching of general chemistry, but the advanced student should have a dental chemist as a teacher. Lay first a strong foundation on which to base your specialty. Dr. Miller was a chemist before he was a dentist. The profession may well spend time for generations in the study of chemistry, if it will produce one such man who will give us a sure footing for future ages. Yes, give us dental chemists at any cost as teachers of the advanced student.

Dr. Howard was pleased to listen to Dr. Palmer's paper, showing so much thought and investigation ; was also pleased that it came from a member of the New York State board of censors, which a few years ago gave no separate examination in chemistry. It shows a decided advance, and promises much hope for the future.

Dr. W. H. Atkinson was called for, and warmly welcomed by the convention. He said he was rejoiced at such efforts as this paper evinced to get at the truth. He was glad that dentists were taking hold of chemistry,—glad the field was being enlarged by earnest workers, who would learn not to accept anything without mathematical demonstration. He spoke of the new germicide called pyoktanin, which he thought was a great microbe-killer,—and the greatest microbe-killer would be the new king.

Subject passed.

The next meeting was appointed to be held in Buffalo, on the last Tuesday, Wednesday, and Thursday of October, 1891.

Adjourned.

Immediately after the session, the members of the several district societies held separate business meetings.

Evening Session.

President Hofheinz called the convention to order at 8 P.M.

Dr. F. P. Denny, of Watertown, read a paper on the subject of "Digestion." This paper is too lengthy for publication in full, and an abstract could not well be made which would do justice to the author. In conclusion, the essayist made an earnest appeal to dentists to make themselves thoroughly familiar with the subject,—the anatomy and histology of the digestive apparatus, the classification of foods, the function of digestion, and the relation of the general subject to dental practice.

Dr. W. H. Atkinson, New York. There is great necessity for dentists being acquainted with the principles of digestion,—to comprehend nutrient changes. We need a syllabus of the principles pertaining to the process of digestion, a primer of digestion, as much as we do the multiplication table. We know too little of the blood and its functions, but we do know that when the internal organs have developed a perfect peptone it can be injected into any portion of the body, and the blood will take it up. It is the single individual element that is the unit of appropriative activity.

Dr. W. C. Barrett, Buffalo, said many points in the paper were subject to question. It had assumed that water was a food. Is water a food? A food is something which goes through a process of disruption. Water simply enters the tissues for lubricating purposes. It does not digest, as it is an inorganic substance, and nothing is a food which is of an inorganic nature. Organic substances only are foods, and water could be said to serve only to dilute.

Incidents of Office Practice.

The president said incidents of office practice were in order for the remainder of the evening. There was no response from the regular members of the convention.

Dr. W. H. Atkinson said he would present the case of a woman who came to him with a peculiar and persistent adenoid growth. She was wearing an entire upper and lower set of continuous gum on a platinum plate, and there was an adenoid growth as far back as the plate went,—back to the pharynx. She had been treated in Paris and London, and at other places in her foreign travel, but without obtaining relief. He diagnosed the case, and in his treatment used a saturated solution of salicylic acid. He painted the tissues thoroughly until they were white. The next morning he found that the swollen condition of the tissues had decreased considerably, and finally subsided until there was left only a little redness of the parts. Soon the slough came away, and without the appearance of a drop of blood. Of course he resorted to constitutional treatment in connection with the above remedy, and in the course of a few days there was a complete cure. He was treating cases of this kind right along now in this way, and with gratifying results.

Dr. Palmer. What was the cause of the trouble under the plate?

Dr. Atkinson could not answer that question very satisfactorily, but thought it could be attributed to constitutional degeneracy,—at least that was all the cause he could give from the knowledge that was imparted to him. There had been many recent cases of a similar nature, —such as those of General Grant and Frederick of Germany, etc.

Dr. F. W. Low, Buffalo, wished to ask what kind of salicylic acid Dr. Atkinson employed.

Dr. Atkinson. From the distillation of coal-tar.

Dr. A. M. Holmes, Morrisville. How long would you allow the application to remain?

Dr. Atkinson. Until it dried.

Adjourned.

SECOND DAY—*Morning Session.*

The morning of the second day was devoted to the inspection of exhibits and to clinics.

The display of dental materials has rarely been surpassed at any dental meeting.

An exhibit which attracted general attention was made by Mr. Drescher, for the Bausch & Lomb Optical Company, of Rochester. It consisted of beautiful microscopical specimens, arranged for inspection under microscopes, as follows : Miller's bacilli in dentine tubules, magnified three hundred and twenty-five times ; human molar, showing dentine and cement, magnified one hundred and ten times ; human incisor, showing approach to pulp blocked by nodules of secondary dentine, magnified forty-five times ; vertical section through molars of the rat, magnified twenty-five times.

A wonderful display of comparative dental anatomy was made by Ward's Natural Science Establishment of Rochester, and the general sentiment was that there had been nothing so excellent and complete at a dental convention. It took the wide range of the whole animal kingdom, from the elephant to the smallest animal, and exhibited hundreds of skulls with dentitions intact. A special feature was a case prepared for dentists, containing six specimen skulls, namely : Hopale Jacchus, the black-eared marmoset of Brazil ; Felis domestica, or the common cat ; Pteropus poliocephalus, or roussette bat of Ceylon ; Arctomys monax, or the woodchuck of New York ; Tatusia peba, or Texan armadillo ; and the Halmaturus thetidis, or pademalon kangaroo of Australia.

Clinics.

The clinics were under the charge of Dr. J. Edward Line, of Rochester, and Dr. J. W. Cowan, of Geneseo. . . . Dr. F. E. Howard, of Buffalo, gave a clinic in which he demonstrated his method of making matrices from strips of copper and tin plate, of twenty-eight to thirty gauge, by simply bringing the ends of the plate together and soldering, to suit special cases, and also the bending and holding in position to meet the requirements of almost any case in filling cavities in anterior teeth. At the same sitting Dr. Howard showed his method of combining amalgam and gold in approximal cavities, using amalgam at the cervix, and any form of gold for the rest of the filling. A special feature was the use of a strip of kid-skin under the plugger, to perfectly adapt the gold to the walls of the cavity and to the amalgam. He also demonstrated how a cavity of decay, where the walls are thin, can be lined with gold by anchorage with balsam-of-fir varnish (Canada balsam), to maintain color in the enamel, and where afterward the filling may be completed with amalgam. He used the smooth ball-end pluggers, which it is claimed facilitate the perfect adaptation of gold to the walls of the cavity. The surfaces of the pluggers were slightly roughened with a very fine sand-paper disk. . . . Dr. C. V. Snelgrove, of Toronto, Canada, filled two approximal cavities in central and lateral incisors, using Dr. Barrett's nitrous-oxide apparatus for obtunding sensitive dentine. He started the filling with Williams's crystalloid gold, and continued the operation with Kearsing's foil, Nos. 4 and 6, using hand-pressure and smooth points. He finished in the ordinary way with Howard strips. . . . Dr. W. W. Smith, of Penn Yan, demonstrated the filling of teeth with crystalloid gold, using the Brophy matrix. It was a compound cavity in the second superior bicuspid, distal surface. He employed gold in cylinder form in the cervical wall. The cavity was in near proximity to the pulp, and very sensitive in excavating. Two obtundents were used. First, the Milton hot-vapor apparatus for sensitive dentine, in the application of which there was no unpleasantness. The effect was somewhat limited, perhaps due to its being the first attempt of the operator to use the apparatus, he having little familiarity with its working. Then a jet of nitrous oxide was applied, with an apparatus which Dr. Barrett had at hand, the effect of the application being unpleasant, but the obtundent effect was quite perfect. The clinic attracted a great deal of attention. The patient was an educated and intelligent young man, and he gave lucid answers to questions concerning the effect of the obtundents and upon other points during the progress of the operation. Dr. Smith feels safer in the use of crystalloid gold with the matrix, on account of the tendency of the gold to spread under pressure of the plugger, while foil has the tendency to draw from the walls of the cavity. Hand-pressure was chiefly employed, in connection with the Bonwill mallet. . . . Dr. George B. Snow, of Buffalo, demonstrated his new method of vulcanizing and packing rubber, which will be found quite fully described in our "Hints and Queries" department for November. . . . Dr. A. P. Burkhart, of Dansville, demonstrated the use of tin and gold in approximal cavities of bicuspids and molars. His method is to use tin foil at the cervical border of the cavity, letting it run up the walls at the side, and filling the rest of the cavity in the ordinary manner with gold. He claimed that in this way a more perfect adaptation can be obtained at the cervical border than in the majority of cavities with gold. He had tested this practice for fifteen years with uniformly satisfactory results.

(To be continued.)

OHIO STATE DENTAL SOCIETY.

The Ohio State Dental Society met in the State Senate Chamber, Columbus, O., October 28, 1890.

The president, Dr. W. H. Sedgwick, delivered an address. He said that fifty years ago the extraction of teeth was the principal part of practice, and mere mechanical skill and ability were the chief requisites for a good dentist, but a great change has been brought about by dental literature and societies. In speaking of quackery, he said, "What would you think of a physician who should advertise, 'The best prescriptions, fifty cents; not so good, fifteen cents'; a lawyer advertising, 'Good opinions, $9.00; cheapest, $5.00'; or a preacher if he were to advertise, 'Sermons, $5.00, and where two are taken on the same Sunday, no extra charge for Sunday-school'?" Dental colleges should accept no student who has not had previous office privileges extending over two or more years. Associations are necessary for every practitioner, and should provide for more clinics. In this State a dental law is necessary whereby a person should be made liable for damages for the extraction of teeth which could have been saved. All, and especially the younger members, should take part in the society proceedings. As a profession we do not read, study, and investigate enough. A post-graduate course was recommended.

Frank Hamilton, M.D., of Columbus, discoursed upon "The Surgery of the Mouth and Jaws," and presented illustrative cases, the operations being chiefly for the removal of tumors. In such operations on the superior maxilla the knife should be started at the middle of the upper lip and carried around the wing of the nose and up under the eye, where there is usually a wrinkle, which should be availed of to prevent the cicatrix being disfiguring. The flap should then be dissected back. After extracting an incisor, he saws through the nasal and malar processes, then dislodges with strong wedge-shaped pliers.

Dr. C. R. Butler urged that the incision for the flap should be artistically done, so as to prevent disfigurement.

Dr. J. Taft read a paper by Dr. N. S. Hoff, of Ann Arbor, Mich., entitled, "Your Old Men shall dream Dreams, and your Young Men shall see Visions." One says our dental laws should be improved. Another suggests a resort for dentists on a high mountain in Georgia. Another, that we should have a higher dental degree for those who study, and there should be a national examining board. Another has offered a dental society a large sum of money to aid in securing it a home. The writer suggested that the Ohio Society have a permanent place of meeting, a museum, library, and laboratory. Columbus would be the best place, being central, a large city, and the State capital. A fund should be raised, a room rented, and an attendant hired. Specialists should be secured to lecture at stated times, and a programme arranged. A journal might also be added. Local societies could be auxiliary.

Dr. Taft said it was possible to meet the project if all would contribute in money, specimens, and appliances.

Dr. Frank Sage, Cincinnati, O., followed with a paper upon "Intimate Diagnosis of Lesions Affecting the Teeth." The idiosyncrasies of the patient and many other points are to be considered. Difficulties frequently arise from the inefficiency of some former operator. A diagnosis is best secured by excluding any irrelevant symptoms. The ignorance and prejudice of the patient are to be taken into account, and we must not be led into error by the history of previous conditions. Nor must we be influenced by mere probabilities. Teeth once affected are more likely to be mistaken as giving rise to subsequent trouble.

Dr. Otto Arnold thought intuition an important factor in diagnosing obscure lesions.

Dr. D. R. Jennings said that if there is any class of men who know little about the teeth, it is physicians.

Dr. M. H. Fletcher said that the existence of pulp-stones was one of the most difficult conditions to diagnose.

Dr. L. E. Custer, of Dayton, O., read a paper on "The Chloride of Methyl," in which he said that some three years ago Dr. R. Ottolengui suggested the use of ether spray as an obtundent of sensitive dentine. Although this was not the first time the ether spray had been used for this purpose, the idea was original with him, and his strong claims for it succeeded in attracting to the subject a degree of attention which resulted in a number of new agents for obtunding sensitive dentine. Dr. Otto Arnold, at a meeting of this society two years ago, said he used a spray of nitrous oxide for the purpose, and he was followed by Dr. G. L. Curtis, who read a paper upon the same agent at the March, 1889, meeting of the New York Odontological Society. The last important obtundent of this nature is chloride of methyl, introduced by Dr. M. L. Rhein.

There has been considerable confusion regarding the action of these agents. Dr. Ottolengui was first led to use the ether spray with the idea that it would produce more thorough dehydration than could be accomplished by alcohol and hot air, and he was successful. But this success was not because it dehydrated, for it does not. First, because ether has no affinity for water; and second, because it reduces the temperature of the dentine, which refrigeration is in opposition to the evaporation of moisture. The ether spray, unless inhaled, obtunds sensitive dentine by no other means than the cold which it produces. Dr. Curtis, in reference to the obtunding action of nitrous oxide, said, "Whether the action of nitrous oxide, as herein set forth, is chemical or mechanical I am as yet unable to state, but by experiments now in progress I hope to arrive at a clear solution of the question. Thus far I am led to the belief that the anesthesia is the result of dehydration." Such experiments should hardly be necessary in view of the fact that it is heat which produces evaporation of moisture—not cold. Chemists say that nitrous oxide has no affinity for water, but it has been observed that water takes up eighty per cent. of the volume of nitrous oxide. The cold produced by the volatilization of nitrous oxide is so intense that the water of the dentine would be frozen before enough could evaporate to produce the profound effects following the use of this powerful agent. The only way in which nitrous oxide could be effective other than by the reduction of temperature would be either by its being inhaled, or, as it is said that after the first few inhalations of nitrous oxide the lining membrane becomes anesthetized, so this eighty per cent. absorbed by the water in the tubuli might in like manner anesthetize the fibrilla. But that is drawing rather a fine point. It seems to me that unless the agent is inhaled in sufficient quantities to produce general anesthesia it must be cold that does the work, and for this reason. For the perfect performance of nerve-function the normal temperature of the organism is necessary. Lowering the temperature somewhat obtunds the sensibility proportionate to the departure from normality. The distance of the bulbous portion of the pulp from collateral circulation (there being no blood-circulation in the enamel and dentine), and the ease with which the crown of the tooth may be isolated from surrounding sources of warmth, make the action of refrigerating agents the most effective obtundents of sensitive dentine that we have.

Chloride of methyl resembles common ether in appearance, taste, and smell, but is not so inflammable. It is produced by the action of chlorine upon marsh gas; by heating together common salt, sulphuric acid, and methyl alcohol; or it is more cheaply manufactured by using the waste product of beets used in the manufacture of sugar.

This is an ether having the formula CH_3Cl. The hydrocarbon radical is very low in the series, and for that reason we find it difficult at ordinary temperature to keep the meythl from passing into the gaseous form. Its boiling point is about 73° F., while that of ether is 96°, rhigolene 64°, and that of nitrous oxide 148° below zero. We therefore have at our command an agent which ranges between ether and rhigolene, and which by the warmth of the hand volatilizes with sufficient force to form a continuous spray. It is capable of reducing the temperature to about 40° below zero, which gives a range wide enough for all ordinary purposes. It has no affinity for water, and when used as an obtundent for sensitive dentine it acts purely by abstracting the heat.

I have found that this medicament has another property of which I have seen no mention, and that is, as a general anesthetic. I have had no opportunity of experimenting on any animal lower than myself, but so far as I can tell it is quite as prompt and powerful as either chloroform or ether. I did not test its full capacity, or I would probably not have been here now. There is one thing in its favor as a general anesthetic, however, and that is this: The theory of Dr. H. C. Wood is that chloroform causes more deaths than ether because it is not so volatile an agent; that when it is removed at the onset of alarming symptoms that which is already in the system continues to act for some time, and occasionally till syncope results; while ether, being more volatile, readily passes off when inhalation ceases. Now, as chloride of methyl is still more volatile than either of these, might it not be found to be a safer anesthetic?

Dr. M. L. Rhein, to whom belongs the credit of introducing it to the dental profession, uses this agent for facial neuralgia as well as for sensitive dentine. It may also be used for freezing histological specimens.

Volatilizing at ordinary temperature, it requires no apparatus for generating a blast, as with ether. Since it is not a solvent of caoutchouc, it may be carried to the tooth through a rubber tube, its flow being regulated by a thumb-screw. It produces more intense cold than ether, and on that account the pain following its application is briefer and the obtunding effect of much longer duration. It therefore also requires less time to obtain the same results secured by ether. It volatilizes so much more rapidly than ether that all the adjoining parts are not liable to be smeared with the agent. The objections to chloride of methyl are that it is a general anesthetic and very likely to be inhaled during the freezing process. It is also at the present time quite expensive.

Taken altogether, I think it is all that Dr. Rhein has claimed for it as an obtundent, and is to be preferred as a cold-producing agent for sensitive dentine. But the older we get and the more experience we have, the better, I think, we can control our patients by a sort of personal magnetism, and the use of dehydrating agents such as alcohol and hot air will in nearly all cases be sufficient, without resorting to such pulp-endangering agents as these extremely potent refrigerants.

Discussion.

Dr. C. R. Butler thought the obtunding effect was due largely to the general anesthetic effect.

Dr. J. R. Callahan concluded that the use of alcohol or chloroform is generally sufficient. A few inhalations of nitrous oxide answer in the worst cases.

Dr. Otto Arnold said that in the endeavor to treat sensitive dentine it is best to impress the patient with the idea that you are doing all you can to relieve the pain. He spoke of the Niles apparatus for using a spray of hot alcohol. A few whiffs of chloroform is a good thing.

Dr. C. R. Butler said that a small amount of chloroform was most dangerous. If patients had as much confidence in the safety of chloroform as they have in nitrous oxide, there would be fewer accidents. He suggested the use of the fountain pen for carrying volatile agents directly into the tooth-cavity.

Dr. H. A. Smith quoted Dr. Hamilton, who said, "Ether may be used with safety up to the point of ether glow." Quacks are often successful because they make their patients comfortable by complete anesthesia.

Dr. P. S. Bollinger had tried nearly all obtundents, but had the best results in working upon the imagination of the patient and by the careful use of instruments.

Dr. J. Taft said that the rubber-dam should be used in all cases in making these applications. There should be two things accomplished, —dehydration and reduction of temperature. The action of cold is more uniform than dehydration, and that is why it is more successful. There might be a combination of volatile agents to be used upon the dentine.

Dr. C. R. Butler, Cleveland, O., read a paper on "A Means of holding the Rubber-Dam while operating upon Labial Surface Cavities."

A great number and variety of clamps with other devices have been manufactured and tried by operators, but the torture to the patient is in many instances almost beyond endurance. Even if the clamp would remain steady after being once placed in position, it is not always possible to carry the rubber-dam over it. Most operators are able to reach ordinary cases, but the query is how to treat the difficult ones. If these can be reached with comparative ease, then we have gone a long ways to solve the difficulty of securing labial surface cavities against moisture while filling with gold. About a month ago several fillings of this character which had been put in by other operators came under his observation, and more were needed. The patient expressed much dread of the clamps, but when told that they would not be used said, "Well, I can stand anything else." In this case two very small screws were placed above the margin of the cavity, but one is all that is needed in most cases. If the drill is nicely gauged to the screw-wire, it will turn in tight with a shallow hold. Set the screw as near the border of the cavity as may be, that it may be the easier cut off and ground down the same as other fillings in finishing. He prefers the hand drill, and never uses a screw tap.

The iridio-platinum or gold wire is hard enough to cut its way in the tooth-bone, and the smallest size screw wire made is the best for the purpose. The little drill made by The S. S. White Dental Manufacturing Co., with a limit shoulder, may be the safest for the operator if he is not able to make one for himself. He puts the screws in and draws the rubber-dam on before commencing to excavate. It is well to dip the end of the screw in the phosphate cream, with a trace of creasote added, when ready to put in place.

Dr. J. Taft derived much satisfaction from the Palmer clamps. They fit each tooth and are not so stiff.

Dr. H. A. Smith drives a chisel edge into the cementum, and it is held by the assistant. Much time is lost by bleeding gums.

Dr. F. Sage sharpens a steel pen and drives it into the cementum.

Dr. M. H. Fletcher suggested using spunk and dry plaster of Paris where the rubber leaks about the neck.

Dr. J. R. Callahan had successfully used the How cervix clamp.

Dr. Butler, in closing the discussion, said that by his method there is no cut in the cementum ; all that is required is to dress off the gold pin as you would a filling.

Dr. J. R. Callahan, Cincinnati, read a paper on "Hypnotism."

Animal magnetism, clairvoyance, and mesmerism are synonymous with hypnotism. Their abuse by charlatans has brought them into disfavor. It is generally supposed that the operator has supernatural powers. Bernheim says that hypnotism operates by suggestion ; all the natural functions being normal. The proportion of persons subject to hypnotism is about eighteen per cent. in both sexes.

Hypnotism has been used with success in organic lesions, hysteric and rheumatic affections. It is difficult to produce when an operation is in the mind of a patient. There is still much superstition on the subject. A professional hypnotist is called an infidel, a crank, etc. When repeated a number of times, the patient becomes increasingly susceptible to its influence. It should not be used at this time in dental practice, but might be in a clinic.

Dr. E. G. Betty quoted Dr. Dunn, who said that hypnotism is a physiological process. The mind of the subject must be calm.

Dr. D. R. Jennings read an article holding that strong-willed persons are self-hypnotized, and followed by saying there is little difference between mesmerism and hypnotism. A patient of his, a believer in Christian Science, allowed him to excavate dentine which previously could hardly have been touched.

Dr. H. A. Smith warned the members against its use ; considered it dangerous.

Dr. W. H. Whitslar said that hypnotism is a sleep. After frequent subjection to it, the patient becomes fearful of the operator. It should not be practiced in the dental office.

Dr. Callahan replied that the power was in the patient, not in the operator. The operator suggests and the patient imagines. It is dangerous.

Dr. F. Jacobs, of Newark, O., introduced the subject of dental microscopy. He makes but one section from a tooth by grinding toward the center from both sides. When thin, it is fixed upon a cork and held against the finest-grade abrading wheel. He never allows the tooth to get dry. He stains with carmine ink and mounts with balsam.

Professor Detmer, of the Ohio State University, made some remarks upon micro-photography, and showed his method of obtaining micro-photographs. Upon a rigid base-board is placed the microscope, which he brings into a horizontal position. Near the slide is placed on the same base a lens for condensing the rays from a good lamp upon the object. Near the eye-piece of the microscope is placed the lens of the camera. The accurate adjustment of the lamp, lens, microscope, and camera is facilitated by a straight groove in the base-board, in which the lamp, lens, and camera work to and from the microscope, which is stationary.

Dr. M. H. Fletcher read a paper entitled "Some Notes on Experimental Implantation of Teeth."*

The following were elected officers for the ensuing year: E. G. Betty, Cincinnati, president; J. R. Callahan, Cincinnati, G. H. Wilson, Painsville, vice-presidents; Otto Arnold, Columbus, secretary; Henry Barnes, Cleveland, assistant secretary; C. I. Keeley, Hamilton, treasurer.

Dr. H. A. Smith was re-elected a member of the Ohio State Board of Examiners for three years.

NEW BRUNSWICK DENTAL SOCIETY.

THE New Brunswick Dental Society was organized August 12, 1890, by act of assembly. The meeting took place at the office of B. H. Torrens, D.M.D., Fredericton, N. B. The following officers were elected: A. F. McAvenney, president; V. H. Torrens, vice-president; C. A. Murray, secretary-treasurer. W. D. Camber, W. H. White, B. H. Torrens, and J. M. Magee were elected members of the council. These, with three members appointed by the government,—A. F. McAvenney, C. A. Murray, and G. J. Sproul,—met at the office of Dr. McAvenney, St. John, N. B., September 30, and elected Dr. C. A. Murray chairman, and Dr. J. M. Magee secretary and treasurer and registrar.

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* An abstract of this paper will appear in a future issue.—ED. DENTAL COSMOS.

The next annual meeting of the society will be held in St. John, on the second Tuesday in August, 1891.

James M. Magee, D.D.S.,
Secretary of Council, St. John, N. B.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At a meeting of the Pennsylvania Association of Dental Surgeons, held on Tuesday evening, November 11, 1890, the following officers were elected for the ensuing year:

Howard E. Roberts, president; Charles F. Bonsall, vice-president; Theodore F. Chupein, corresponding and recording secretary and reporter; William H. Trueman, treasurer.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A meeting of the Massachusetts Board of Registration in Dentistry for examination of candidates will be held in Boston, Wednesday, December 17, at 10 A.M., at 100 Boylston street.

E. V. McLeod, *Secretary.*

THE PHILADELPHIA BANQUET TO PROFESSOR MILLER.

At the complimentary banquet tendered to Dr. W. D. Miller by the Odontological Society of Pennsylvania, Monday evening, October 6, there were present about sixty representatives of the dental and medical professions. Dr. E. T. Darby was toast-master. Before naming the toasts and calling for the responses, he referred to the fact that about thirteen years ago, while he was in Europe, Dr. Miller came to him with a letter of introduction from Professor Truman, in which it was stated that the bearer was about to go to America to pursue his studies in dentistry, and that he promised to be an ornament to the profession. It was fit, therefore, that he should call upon Dr. Truman to respond to the toast, "Our Guest."

Dr. Truman said that the occasion called to his mind the history of some of the lines of progress which had been made. He reviewed the researches in the direction in which Dr. Miller had labored, the help given by other investigators, their failure to reach demonstration, and the success which had crowned Dr. Miller's patient toil. He combated the idea that devotion to one special line of work narrows the individual, and thought that it is only by such special concentration that progress is made,—the knowledge of each becoming the possession of all. He well remembered that some thirteen years ago, Professor Miller, then a student in Berlin, called upon him in that city, requesting his advice as to the selection of a profession. He told him then in substance that dentistry offered him a larger field and would bring him sooner into a prominent position than any other. Whether influenced by that advice or not, he came to Philadelphia and to the Pennsylvania College of Dental Surgery; then to the University of Pennsylvania, where he received his degree of D.D.S. Professor Miller first laid a solid foundation. Graduating at the University of Michigan, he went from there to Edinburgh, from Edinburgh to Berlin, from Berlin to the University of Pennsylvania, thence back again to Berlin, to receive German honors by his election to the first professorship in the university of that city. Those who are familiar with the prejudices and jealousies which exist in the older countries appreciate what such an honor as that means. In 1880, when he called upon him in Berlin, he found him busy in his laboratory endeavoring to solve certain problems. In the course of a year or two there appeared, one after another, those contributions of his pen which were so eagerly read, developing the fact that the problems which others had worked at and had come near to but not quite succeeded in solving, had been demonstrated by Dr. Miller. He pointed out the micro-organisms concerned in the production of caries, and isolated and named the peculiar acid which caused the destruction of teeth. He demonstrated the correctness of his position by producing artificially the same results out of the mouth. The opposition which was aroused by the promulgation of Professor Miller's theory has died out, and he stands to-day as the demonstrator of the etiology of dental caries.

Professor Miller, responding to the toast of "The Dental Specialty in Europe," expressed sincere thanks for the complimentary introduction of Professor Truman, to the Odontological Society of Pennsylvania, to the representatives of the dental profession present, and to the many eminent members of the medical profession who had not deemed the occasion unworthy of their presence. He could respond to the toast only so far as it referred to Germany, the conditions being so different in the several European countries that it would be impossible to give any intelligent description in the short time at his disposal. In 1869 a law was enacted in Germany which in effect entitled anyone to practice medicine or any specialty of medicine without any qualification whatever. While this law did not affect the practice of medicine, it had a marked effect upon the practice of dentistry. A class of "teeth-artists" appeared, who entered upon the practice of dentistry from the stand-point of the mechanic. At the present time, while there are not more than one thousand qualified practitioners, there are four or five times that many who have no qualification except such chance information as had been picked up. Some of these men become skillful in mechanical directions, and compete successfully with men who have graduated from dental colleges. It is only within recent years that dental students received instruction in practical dentistry. Formerly they were launched upon the world utterly unprepared, and therefore the " teeth-mechanics" were able to compete with them. This has had the effect of stimulating the dentists to better qualify themselves for intelligent practice. Of course many German dentists made for themselves enviable positions in practical as well as in scientific dentistry, although the mass of the profession, as already set forth, was in practical dentistry far below the standard reached in America. Four or five years ago a few American dentists located in Germany, and have exerted a marked influence for good. Within the last six years schools of dentistry have been established as departments of several German universities, and in the school with which he is connected an earnest endeavor has been made to emulate the thoroughness of instruction in American schools. In one respect he thinks they are in advance, as they engage personally in the clinical instruction of the students. He gives from two to three hours daily to instruction in dental manipulations.

Professor Miller next alluded to the study of bacteriology, which in his judgment had had more to do with the development of the dental specialty in Germany than anything else, the methods of Professor Koch having made the knowledge of this subject accessible to every-one, and many are devoting themselves to the study of the micro-organisms of the human mouth. Of these which find a fertile field for vegetation in the mouth, there have been discovered seventeen varieties, which have been divided into three groups, all of which have pathogenic properties. The probability is that an additional number will be found by further experimentation. These discoveries have created great interest among physicians as well as dentists, and many clinical cases have been reported as proof of the fact that the condition of the mouth exerts a marked influence upon the general health. In looking over the literature of the subject he had found between forty and fifty cases of death resulting from abscesses caused by diseases of the teeth, or from dental operations which had been performed without proper antiseptic precautions. One of his students, engaged in similar investigations, found in a short time the history of twenty-one cases of like character which had occurred in two hospitals in Germany. Doubtless there have been hundreds of such cases. It is highly probable that various manifestations of ill health are due to diseased conditions of the mouth. Odenthal undertook to determine whether decayed teeth were not actually often the cause of swellings of the lymphatic glands of the neck. He examined 987 children, and found decay of the teeth in 429. In 558 no decay was present. Of these 558, glandular swellings were noticed in 275 cases,—that is, in 49 per cent. Of the 429 with decayed teeth, swellings were noticed in 424 cases,—that is, in 99 per cent. He was able to establish a constant relation between the extent of the glandular swellings and that of the decay.

Professor Miller had examined one case, incited thereto by the exceedingly unpleasant odor of the breath, to determine how many bacteria may exist in the human mouth at one time. He found that there were no less than one billion one hundred and seventy million germs present. The swallowing of vast numbers of these micro-organisms at every meal must exert an untoward influence upon the general health. James Israel, who has given much attention to actinomycosis, found in a case of that class a small irregular body which he sent to the speaker for examination, and which was found to consist of a small fragment of dentine surrounded by a chalky mass, presumably tartar. Microscopic examination revealed numerous threads of the ray fungus. There can be little doubt that this fragment was the carrier of infection and the cause of the death of the patient. Other cases were cited to illustrate the position that pneumonia and tonsillitis are frequently caused by micro-organisms developed in the oral cavity.

The physicians in Germany are taking greater interest in dental matters, but a higher standard of education is needed to develop a more intelligent appreciation of the importance of such facts as have been alluded to. They are therefore aiming in Berlin to extend the course of study. At present there is virtually a three-years' course instead of the two-years' course which prevailed a few years ago. Physicians, as well as dentists, have recognized the fact that medicine meets upon common ground with dentistry, and that it would be as impossible to separate medicine from dentistry as to separate the mouth from the alimentary tract.

Dr. Wm. Pepper, responding to the toast, "Educational Demands of the Healing Art," remarked that the subject assigned to him was so large that he could not attempt to do justice to it. He said that there were two or three thoughts suggested by Professor Miller's most interesting and important remarks to which he wished to call attention from the stand-point from which he would naturally consider them. He thought we could take credit to ourselves in this country, and especially in this city, for the pioneer way in which we had frankly recognized the dental profession as an integral part of the great medical profession, and the dental practitioner as the colleague of the medical practitioner. In this way we have contributed to the promotion of dental science, to the strengthening of dental institutions, and to the encouragement of dental practice in the presence of a certain prejudice which the younger men present would scarcely appreciate, but which the older men could well remember. He was glad to be allowed to speak on this subject, being connected with an institution that he was proud to say had been prompt to act in the matter. He said there was to-day no department of the University of Pennsylvania which is regarded by the authorities of that institution and by the community with greater interest and with more worthy pride,—none in which the character of the work is more earnest, thorough, and good, none in which the standard is more steadily maintained, nor in which the determination to carry the grade of work to the highest attainable point is more settled, than in the dental department.

The educational demands of the healing art, as it impresses alike the general practitioner and the specialist, is a difficult subject. The conditions under which we have been living for the past century have been inimical to a high standard, but the requirements are becoming higher. Medical men, dentists, all classes of scientists, are earnestly seeking to establish the highest grade of education that is within their reach. The dental specialty was started in America, and placed upon so high a position that the world has been obliged to be imitators of American dentistry. But it is clear that unless we realize that our educational requirements must be high and exacting, we shall not maintain our pre-eminence in this specialty. We may be sure that the same thorough spirit which has made German medical education an exemplar for all medical institutions of the world will be applied to the dental specialty, and unless practitioners in America insist that our educational requirements shall be steadily increased as a higher grade of students presents from year to year, we shall find that where we have had precedence we shall begin to lag behind. He was confident that the time was fast approaching when our medical institutions would be established upon a stronger basis, and the standard of education advanced, so that we can look with confidence to the future.

There is a thought suggested by the remarkable career of our guest,—a career which would have been exceedingly difficult in this country. One of the requirements most earnestly needed here is the endowment of research,—positions where men of ability could have their maintenance secured to them so that they would be enabled to devote their time to abstract study, which is with us consumed in practical details. It would not be safe to draw inferences from the career of so remarkable a person as our guest. There are persons whose energy and power of aiding themselves are so extraordinary that, although hampered by work, they accomplish results that other men could not accomplish if they devoted their whole time to it. If our education in any branch is to keep pace with what is being done abroad, if we are to furnish our quota to this remarkable epoch, if the educational standard is to be advanced, it is necessary that our institutions shall not only have the highest equipment but the best teachers, masters of their respective branches,—that they shall possess an endowment which shall give maintenance to men like our guest, who are able to see farther and clearer into the difficult problems which are before us, to open paths in which we can walk securely. We must be discontented with our past achievements, however great they may have been, and when we have secured an advantage must hold it. Practical success is not the highest success. The demonstration of scientific truths constitutes the only real basis for future successful practical work.

Dr. W. W. Keen was called upon to respond to "Modern Methods in General and Dental Surgery." He remarked that he did not know of any better illustration of modern methods as applied to dental surgery than the statement made by Professor Miller to-night. The cases of which he has spoken, of death resulting from dental caries and dental abscesses, are exceedingly interesting and important, and no less so the methods and means of successfully combating such conditions. Professor Miller is a striking illustration of the fact that a man cannot know too much, not only of his own specialty, but in other lines which are apparently not allied to it. If his earlier studies in chemistry had not been so thorough, he could not have accomplished what he has in his researches into the etiology of dental caries. It is very evident also that he is well versed in pathology, and in addition has been an exact observer,—familiar, in fact, with almost every department of science. Bacteriology has revolutionized the theory and practice of dental surgery. The discoveries in this direction are in line with that revolution whose story reads like a dream, but which has really passed before our eyes in general surgery. The surgical operations which were performed in the late war, and in which we boasted, would be ranked as simply barbarous at the present time. General surgery touches at many points with dental surgery. In various diseases of the mouth and jaws, in fractures of the maxillæ, in irregularities of the teeth and deformities of the mouth, the dentist is taking precedence of the general surgeon. In many respects he felt under obligation to his dental brethren, and especially for what he had learned from them with reference to skillful manipulation.

Dr. Ernest Laplace, being called upon to respond to "The Relation of Modern Pathology to Dentistry," expressed his gratification at the opportunity to pay tribute to a man who has ennobled his profession and honored his country in foreign lands by demonstrating in his own work the true relation of modern pathology to scientific dentistry. Thirty years ago a giant intellect worked in a small laboratory in Paris. There Pasteur, with the world of science against him, discovered the influence of micro-organisms upon organic matter, and demonstrated the true nature of fermentation and food-putrefaction, and that it is due to the presence of micro-organisms. Lister's practical mind applied this knowledge, and gave to the world the blessing known as antiseptic surgery. There are processes of putrefaction in the mouth due to the invasion of particles of food by micro-organic growths, producing a corrosive substance that gradually corrodes the enamel and impairs the dentine. Professor Miller, to his honor be it said, was the first to recognize the fact that this substance was lactic acid, which, uniting with the lime of the teeth, produced the lactate of lime,—an analogous process to that of caries in bone. This entitles Professor Miller to be recognized by the world as the Lister of dentistry.

The aim of the modern surgeon is to obtain the healing of wounds without suppuration. To this end he eliminates the micro-organisms, and uses dressings to prevent the access of germs to the wound. The dentist applies the same principle in his treatment of carious cavities in the teeth. The teeth, like other parts of the body, are influenced by diathesis. Chronic and acute inflammations and abscesses in the mouth are due to the same pathological conditions which produce like results elsewhere in the body. Orthopedic surgery finds in dentistry ingenious appliances of applicability outside of dental practice. There is a science and an art in dentistry, and it is only through scientific acquirements that the highest development of the art can be reached.

Dr. Harrison Allen was asked to respond to "The Bond of Union between Dentistry and Medicine." He prefaced his remarks by a personal explanation relating to a valedictory which he had delivered to the students of the Philadelphia Dental College, in which institution he taught anatomy from 1866 to 1878. In the course of that address he claimed that dentists should make themselves the authority in all matters relating to the teeth, their origin, structure, and functions; that every contribution to knowledge in dentology by any other than a dentist was a reflection upon them. He had called attention to the fact that up to that date the principal writings pertaining to the teeth had not been contributed by dentists, but by such men as Hunter; that all the literature of the subject was English, and by authors other than dentists, until we came to the work of the younger Tomes. He was a young man at the time, and not a dentist, and he was told that it was impolitic to have made that statement. Perhaps it was impolitic, but all would admit that it would have been a burning shame if any other than a dentist had done the work for the doing of which we are here to-night to honor Professor Miller. With reference to the "bond of union" alluded to in the toast, it would seem from this evening's proceedings that there is no bond, because dentistry and medicine are essentially one. The idea that there is a bond would seem to imply the union of two things not entirely similar. Dr. Allen reviewed at some length the history of medicine and the history of dentistry, having a common origin, but diverging as did the functions of the surgeon from those of the barber, which at one time were associated. Gradually they became two lines of occupation in place of one. The parallel in our own time is that of the divergence of surgery from medicine.

There are still a great many men in the dental profession who are interested only in the practical side of their calling, and not in the scientific, not recognizing that the scientific is the basis of the practical. In the history of medicine we can see how not a step has been taken but that the correlative science has come up to the same level. Speaking of the advance in medicine, English-speaking people can claim all of it so far as it pertains to science. For example, the great Sydenham was the first to make a scientific system of medicine. In anatomical and pathological studies Hunter stands first ; in dentistry, an Englishman, the younger Tomes, and Professor Miller represent us.

Dr. Edward C. Kirk expressed, on behalf of the committee, the gratification which they felt in having had an opportunity to present before such an audience a dental ideal,—an ideal which has been so largely realized in the work of the distinguished guest of the evening. An epitome of what that work has been shows that in the fall of 1877 Professor Miller came to Philadelphia and matriculated at the Pennsylvania College of Dental Surgery, and the following year took a course in the dental department of the University of Pennsylvania. Returning to Europe in 1879, he began the practice of dentistry, and at the same time pursued his studies at the University of Berlin. The result of his labors there was published in a series of papers, beginning with one on "The Agency of Micro-Organisms in Caries of the Human Teeth," published simultaneously in *Klebs's Archives* and the DENTAL COSMOS. This was followed by some thirty communications in the same line of research, the most important of which are a series of papers on "Fermentation in the Human Mouth," a series entitled "Biological Studies on the Fungi of the Human Mouth," "Micro-Organisms of the Alimentary Tract," "Wörterbuch der Bacterienkünde," and a larger work, "Die Mikroorganismen der Mündhole." This latter work is about to appear in English. When his first thesis was published, in which was established the exact nature of dental caries, and in which he had proved to the point of demonstration the exact nature of the process, the dental profession of the two continents applauded, and all were astonished. There were a few, however, who were not surprised,—the men who had sat on the college benches with him and were familiar with his qualities and methods of work while there.

Professor Miller has had from the beginning the ambition of precision in his work. It is this which gives value to his results. That his work is clearly scientific and thoroughly practical is well shown in his investigations of dental caries. We are not here to honor Dr. Miller ; a man with his record needs no greater honor than his works. We are here to show our appreciation of his achievements. We appreciate him as an American who has made a record in Europe, and compelled recognition in a city where intellectual advancement and learning are of the highest order,. and our grateful appreciation is due to him for the impetus which he has given to the cause of scientific dentistry.

EDITORIAL.

THE DENTAL COSMOS FOR 1891.

IN looking back over the thirty-two years during which the DENTAL COSMOS has made its monthly visits to its readers, one can trace the progress of dentistry as in a panorama ; can see the gradual improvement in methods, in materials, in education, in professional spirit, and can trace as well the uniform improvement from year to year of the COSMOS itself. Surely no previous volume will bear comparison with that which is completed with the current year.

But our ambition is not satisfied, and we hope, and with good reason, that the volume for 1891 will surpass that of 1890 as much as the latter excelled its predecessor. Its rapidly increasing circulation shall not outrun the steadily advancing recognition of its pre-eminence in dental journalism.

DENTISTS AS MANUFACTURERS.

A NUMBER of correspondents have written us concerning the classification by the Census Department of dentists as manufacturers, and that they have been furnished with complicated manufacturers' return blanks. The Philadelphia County Dental Society, at its annual meeting in October, unanimously adopted the following resolutions :

> WHEREAS, It appears that under the census now being taken dentists are classified with manufacturers and are being requested to fill out and return a manufacturer's blank, and

WHEREAS, Dentistry is a liberal profession, and a branch of the healing art, and in no sense a manufacturing business; therefore

Resolved, That this society protests against such classification, and instructs its members to decline to attempt the impossibility of making any return upon such blanks.

The classification of dentists as manufacturers is manifestly an improper one, and it is reasonable to suppose that the Department will so decide under a proper presentation of the matter.

UNJUSTIFIABLE PATENTS.

AT a meeting of the Central Dental Association of Northern New Jersey, held September 15, 1890, the subject of illiberal patent methods in dentistry was presented by Dr. W. H. Rehfuss, of Philadelphia, and discussed by the members. The "cutting off a tooth," "the removal of tooth-pulps," "the fitting of a band or ferrule to the end of a tooth," etc., were quoted as examples of recent patents. A committee was appointed to bring this matter before the profession and ask the co-operation of dental societies. This committee has framed a bill and an appeal to Congress, and desires that each society appoint three of its members, who shall be members of the general committee. Copies of the bill and of the petition are to be forwarded to all dental societies, and can be had of Dr. W. L. Fish, secretary, Newark, N. J.

OBITUARY NOTICES.

THE letter of Dr. Richard Grady in the present number calls our attention to a not infrequent complaint of our failure to make mention of the death of prominent members of the profession. As a matter of course, we are dependent upon the members or friends of the family of the deceased for notice of the fact and for reliable data in such cases, without which we cannot be supposed to be in possession of the facts that it is desirable should be noted.

We should be thankful to receive information as follows in case of the death of a dental practitioner :

Place and date of death.
Cause of death.
Place and date of birth.
Date of dental pupilage, and with whom.
Date and place of entrance on dental practice.
When graduated, and at what college.
Member of what dental societies, and what offices held in them.
To whom married, when and where.
Survivors ; widow or children.
Any data of professional interest not above indicated.

THE INDEX TO THE CURRENT VOLUME.

We call attention to the index of the current volume in this number of the Dental Cosmos, as illustrating the wide scope of the topics treated either in original communications, in the reports of societies, or in other departments of the journal. This is the most complete index, and covers a greater number of topics relevant to dentistry than ever appeared before in any dental periodical.

BIBLIOGRAPHICAL.

The Micro-Organisms of the Human Mouth. The Local and General Diseases which are Caused by Them. By Willoughby D. Miller, D.D.S., M.D., Professor at the University of Berlin. With one hundred and twenty-eight illustrations, one chromo-lithographic and two photo-micrographic plates. Octavo, pp. xx, 364. Philadelphia: The S. S. White Dental Mfg. Co., 1890. Price, cloth, $5.00.

The work of Professor Miller as bacteriologist and investigator in the department of dental pathology has become to a certain extent familiar to us through the publication of the results of his labors from time to time in the dental journals during the past eight years. Bearing, as the work did, the stamp of extreme carefulness and uncompromising accuracy, his conclusions were accepted by those most competent to judge as accurate and final, and he was quickly accorded position as an unquestioned authority in his particular field of research. The publication of his most pretentious work, "Die Mikroorganismen der Mundhöle," of which an elaborate review by Professor James Truman was published in the Dental Cosmos for January, 1890, showed not only the evidences of the same careful method which made his discoveries possible and achieved for him such an enviable reputation as an investigator, but it has revealed him in the unfamiliar rôle (to the general profession, at least) of teacher. The merits of his work as portrayed in "Die Mikroorganismen der Mundhöle" have been thoroughly discussed from the technical stand-point in Professor Truman's review, making further reference to this phase of the subject superfluous. It may not be out of place to call attention to the importance of the bearing which the work of Professor Miller must undoubtedly exert upon dental practice, now that his methods and results have become accessible to the English-speaking practitioner through the publication of the present translation.

Progress in all departments of human knowledge is the result of growth by accretion, and proceeds with a degree of regularity in direct proportion to the acquisition of facts in any given department. It exhibits marked stages of acceleration, and the potentiality of the knowledge gained is strongly emphasized when, by reason of the completeness of the data at command, generalizations are possible from which the underlying scientific principles may be evolved. From such points progress takes place in something like a geometrical ratio, and we advance from empiricism in the use of facts to wisdom based upon scientific exactitude. Analogous centers of growth are noticeable in the arts when discovery is made of a new method of procedure which is the embodiment of a broad scientific principle capable of wide application, or when a new material is discovered in which art can find expressions, utilitarian or otherwise.

The discovery of the direct causal relation of specific micro-organisms to certain pathological conditions, and the refinement of methods of bacteriological investigation, have within the past decade in many instances revolutionized pre-existing hypotheses as to the etiology of these disorders, brought about a corresponding change in therapeutic methods, and likewise compelled recognition of the importance of prophylaxis and thrown much light upon means for its successful attainment.

This admirable translation of Professor Miller's book places in the hands of the English-speaking dentist the means for acquiring the best that is known of the subject under consideration so far as it is related to dental practice. The book will be valuable as an educator not only on account of the matter which it contains, but in no small degree because of the simplicity and clearness with which the author presents to the student the methods by which he himself has acquired the knowledge in question ; he exhibits high excellence as a teacher by reason of a certain sympathetic understanding of the needs of the student, which is evinced throughout the work.

Evolution as a method of development is as certainly a fixed fact in mental growth as in any department of biology, and the dental practitioner whose mental equipment is most thorough will most successfully meet the demands which the various conditions of his practice present for his consideration and treatment. The investigations of Miller have demonstrated beyond all reasonable doubt the pathogenic relation which certain micro-organisms bear not only to caries of the teeth, but to many of the inflammatory conditions pertaining to the oral tissues which it is distinctively and exclusively the province of the dentist to treat, and having done this he has indicated the lines along which we may properly hope to successfully combat such pathological conditions. The tendency in the minds of some to regard work of this character as indefinite and without practical utilitarian value in relation to the daily needs of a busy dental practitioner is lamentable, though true; but it is equally true that what the dental engine and rubber-dam are to dental art and technique, the facts of dental pathology and bacteriology are to successful dental therapeusis and prophylaxis.

It becomes, therefore, not only desirable but essential for every dental practitioner to make himself familiar with this work if he would achieve successful results in the department of dental and oral therapeusis,—success not as measured by past standards, but from the more advanced plane which in the light of Miller's researches has been attained, and the possession of such knowledge as a part of his mental armamentarium will be the badge of his fitness to survive.

As a specimen of book-making the volume is a handsome embodiment of modern excellence in that art, leaving nothing to be desired as to quality of material, typography, etc. EDWARD C. KIRK.

THE PHYSICIAN'S VISITING LIST (Lindsay & Blakiston's) for 1891. Fortieth year of its publication. Philadelphia: P. Blakiston, Son & Co., successors to Lindsay & Blakiston.

The excellence of this neat little visiting list for physicians is so well known that we need only call attention to its appearance. The publishers truly say that "strength, compactness, convenience, and durability are the essential qualities which a good visiting list should possess, to resist the usual hard wear it receives." The thirty pages of preliminary matter include the usual specific information and valuable tables for ready reference. Its size and weight allow of its being conveniently carried in the pocket. The price varies, according to thickness and binding, from one to three dollars.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION, at the Thirtieth Annual Session, held at Excelsior Springs, Mo., commencing on the 5th of August, 1890. Chicago: H. D. Justi—The Dental Review Company, 1890.

This annual visitant comes to us in its usual attractive form of substantial binding and good paper. Members of the profession who wish to be *en rapport* with the progress of their art and its literature will find food for reflection in this volume. There is no question of the ability and lasting value of many of the papers and reports read before this association. Copies of the book may be obtained by addressing the recording secretary, Dr. George H. Cushing, No. 96 State street, Chicago, Ill.

IRREGULARITIES OF THE TEETH AND THEIR CORRECTION. By J. N. FARRAR, M.D., D.D.S.

We have received the first volume of this work, but too late for review in this number.

OBITUARY.

DR. WILLIAM W. FOUCHÉ.

DIED, in Philadelphia, Pa., November 13, 1890, of gastritis, WILLIAM W. FOUCHÉ, D.D.S., in the seventy-seventh year of his age.

Dr. Fouché was born in New York city, September 29, 1814. His dental pupilage was passed with Dr. Samuel S. Fitch. He first entered the practice of dentistry in Philadelphia, in 1834. He received the honorary degree of D.D.S. from the Philadelphia College of Dental Surgery in 1853. In 1852 Dr. Fouché was president of the Pennsylvania Association of Dental Surgeons, and was for a long time secretary of the board of trustees of the Pennsylvania College of Dental Surgery.

Dr. Fouché secured and retained the affectionate esteem of a large circle of friends. He was married, July 5, 1838, to Miss Mary Wilson, who survives him. He also left four children,—two daughters and two sons.

DR. GUSTAVUS A. GERRY.

DIED, at Lowell, Mass., October 24, 1890, of cancer of the stomach, Dr. GUSTAVUS A. GERRY, in the sixtieth year of his age.

Dr. Gerry was born at Harvard, Mass., in 1831. He commenced the study of dentistry with Dr. Fitch, of Clinton, Mass., in 1857, and graduated from the Boston Dental College in 1874. He commenced the practice of his profession in Lowell, Mass. He was a member of the New England Dental Society, of the Massachusetts Dental Society (of which he was treasurer at the time of his death), and of the American Academy of Dental Science. He had served as president of both the Massachusetts and the New England societies. He was married in 1861 to Frances Crowell, of Lowell, Mass. He leaves a wife and two sons, Drs. George H. and Arthur C. Gerry.

DR. B. T. MASON.

DIED, at Phœnix, N. Y., September 3, 1890, B. T. MASON, D.D.S.

Dr. Mason was a graduate of the Department of Dentistry of the University of Pennsylvania, class of 1881, and subsequently located in practice at Phœnix, where he soon acquired an extensive clientage.

Dr. Mason was a member of the Dental Society of the State of New York, and also of the Fifth District Dental Society, and was twice president of the latter. He took an interest in other matters than those strictly professional; was a member of the Board of Education, and held other offices in Phœnix.

HINTS AND QUERIES.

To the Editor of the Dental Cosmos :

Sir,—Miss Gunning, in a letter to the undersigned, says, "Will you kindly make known the fact that Dr. Thomas Brian Gunning died January 8, 1889? It seems strange that the dental profession at large is not yet aware of his decease."

No mention of Dr. Gunning's death appears in the obituary notices in the Dental Cosmos from January, 1889, to November, 1890 ; neither is his name to be found in the register of deaths in the catalogue for 1889–90 of the dental college that made him an honorary graduate in 1880. It is to be regretted that the death of one whose name has been "heard 'round the world" for his successful use of interdental splints when eminent surgeons had signally failed to secure by ligatures and bandages fractures of the jaw has not been recorded in the Dental Cosmos, and thus made known to the profession through its large circulation. In the medical report of the Centennial Commission (1876), Gunning's interdental splint, applied February 12, 1861, is admitted to be *the first splint ever used without an appliance outside the mouth.* Moreover, the dental profession is specially indebted to Dr. Gunning for relief in 1880 from the unwarranted demand of the Census Bureau for statistics, on the ground that dental offices are "establishments of productive industry," and dentists are required to furnish statistics of manufacture. Dr. Gunning convinced the superintendent of the census (General Francis A. Walker) that such a demand was made in ignorance of what dentistry is, and the result was that General Walker determined to omit "dentistry in *all* its branches" from the tabulations. The Census Office has recently ruled (September 23, 1890) that "the term (mechanical dentistry) is considered to embrace all branches of the profession, except the extraction of teeth ;" and dentists in Baltimore have consequently been subjected to annoyance and trouble, which the profession generally was spared in 1880 through Dr. Gunning's efforts. The writer has been called on at his office and spoken to probably a dozen times by a special agent of the census respecting a report on "General Schedule No. 3."

Baltimore, November, 1890. Richard Grady, M.D., D.D.S.

To the Editor of the Dental Cosmos :

Sir,—In looking over the suggestions for legislation proposed by the Association of Dental Examiners, I notice a serious omission, which seems too much like leaving out the foundation or the corner-stone of a structure ; and with the prevailing and increasing appreciation of and demand for sound knowledge of the general laws by which nature acts in health and disease, such omission will be deemed a notable defect.

To remedy it there should be added a provision *prohibiting certificates to special graduates or practitioners without general qualifications in knowledge of the fundamental principles of medicine and surgery ; such qualifications to be determined by as thorough tests as the special ones.*—Jacob L. Williams.

Boston, October 14, 1890.

A Perforated Root.—A patient now under my charge had a devitalized tooth opened by an inexperienced operator, who perforated the root with a drill about half the distance between the gingival margin and the apex of the root. There is now a minute fistulous opening. Will some one inform me what is the best method of procedure to remedy the trouble ?—H. C. S.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

Barrett (A. W.) Dental surgery for medical practitioners and students of medicine. 2. ed. Philadelphia, 1890, P. Blakiston, Son & Co. 136 p. 12°.

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THE S. S. WHITE DENTAL MFG. CO.

Inclosed find **$2.50**, *for which please send me the* **Dental Cosmos** *for 1891.*

Name..

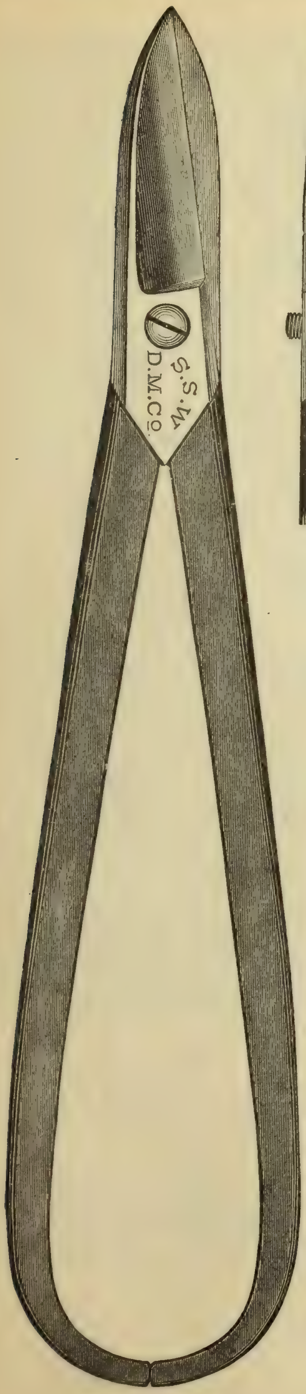
Street No...

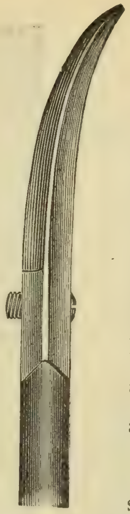
Post Office...

County..

State...

PLATE SHEARS FOR CROWN- AND BRIDGE-WORKERS.





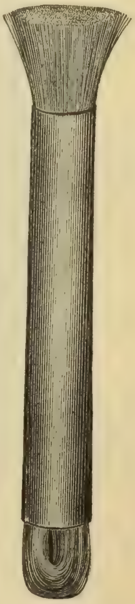
Designed especially to permit the delicacy and nicety of manipulation so frequently necessary in constructing crowns and bridges. To this end the blades are made short and strong, with small, neat points, and the handles light and relatively long so as to afford ample leverage. Cuts are full size.

Made of solid steel, either straight or curved.

Price, Straight . .	per pair	$0.90
" Curved . .	"	1.15

Flexible Steel Scratch Brush.

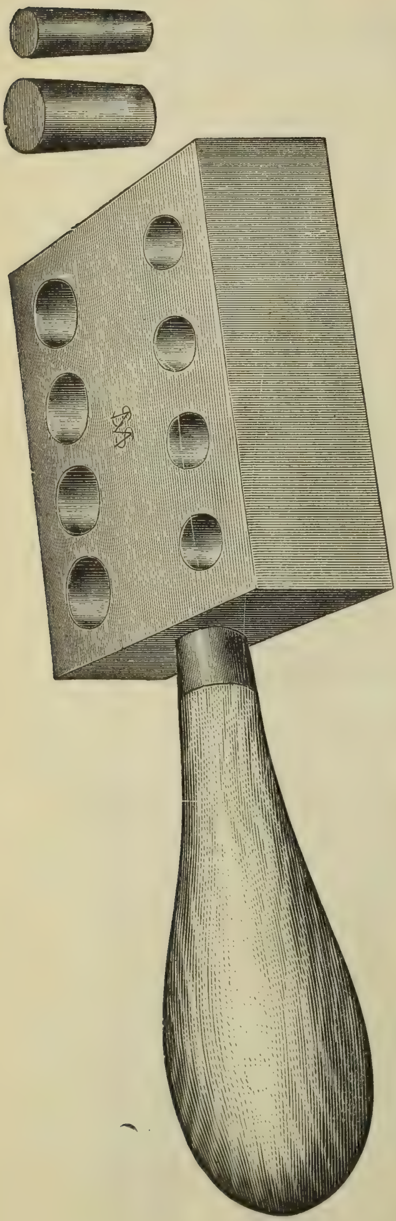
Suggested by Dr. T. M. HUNTER.



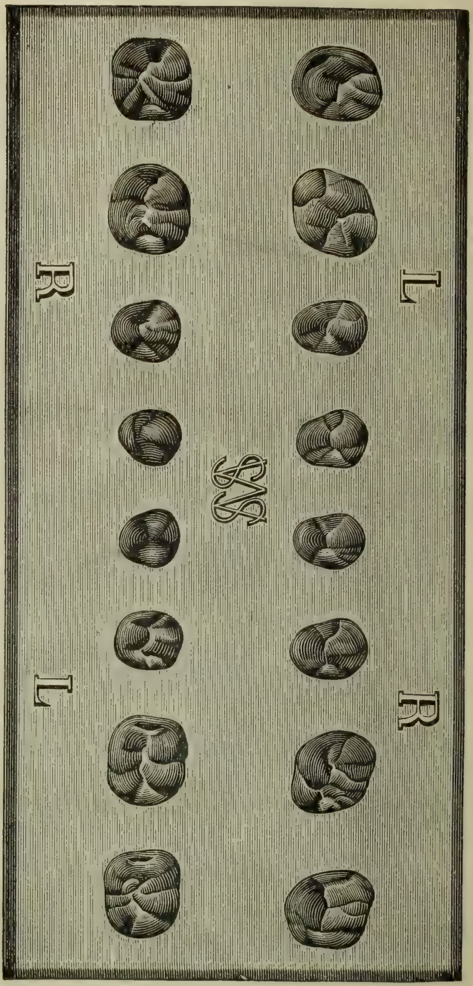
The inequalities on the inside surfaces of rubber plates—that is, those intended to rest against the mucous membrane of the mouth—afford inviting receptacles for plaster, etc., which, as every artificial plate-worker can testify, is difficult and tedious of removal. Dr. Hunter suggests a small Scratch Brush, made of steel, flexible all over, as the most efficient means he has tried. The wire forming the bristles being fine and the handle flexible, the working part is readily applied just where it is wanted, and the specks easily removed without abrading the rubber appreciably.

Price . . . $0.25

DIE-PLATE AND HUB-MOLD FOR MAKING CAP-CROWNS.



Hub-Mold.



Die-Plate.

These inventions were described in the DENTAL COSMOS for August, 1887, pages 482 to 485. This description also accompanies each Die-Plate.

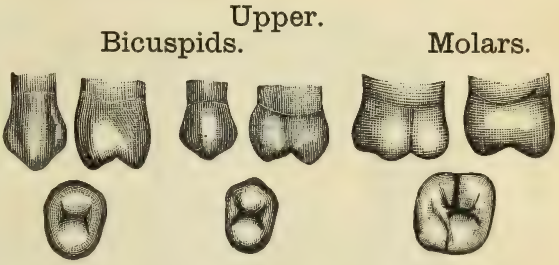
The Die-Plate is made of a special hard alloy and the Hub-Mold of cast iron.

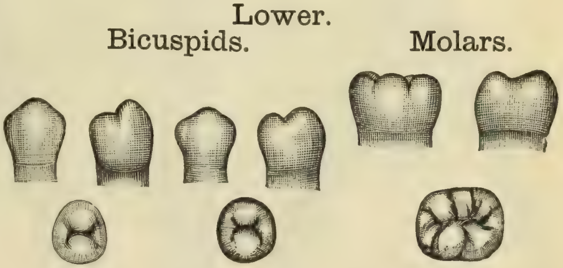
PRICES.

Die-Plate	$4.00
Hub-Mold	1.00

The Evans Gold Seamless Contour Crown.

Patented Nov. 15, 1887.





Dr. Evans claims to have solved the problem of supplying a ready-made gold crown of practical form and perfect adaptability. We present some of the typical forms, each of which is made in a variety of sizes of crown and cervix. Thus, one of the upper bicuspids is made in nine sizes of crown, each of which again is made in three sizes of neck form. The entire set, including forms for contracted spaces, comprises two hundred crowns, affording a range of sizes and shapes sufficient to meet almost any possible case.

They are made of fine gold, seamless, so that each presents a uniform surface, which will not tarnish; they are easily and quickly adjusted, requiring only ordinary skill; they are readily altered to suit particular cases.

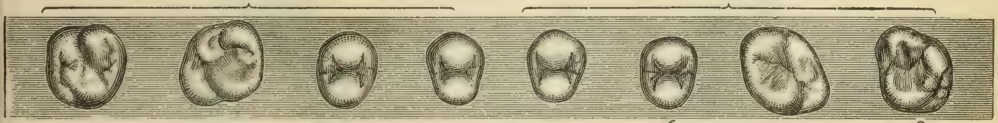
A chart, showing the exact sizes, with directions, sent on application.

PRICES.

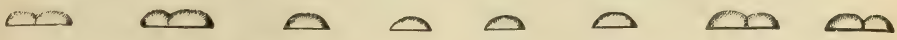
Gold Bicuspid Crowns, all sizes	each $2.00
" Molar Bicuspid Crowns, all sizes	" 2.50

Solid Gold Cusps for Crown- and Bridge-Work.

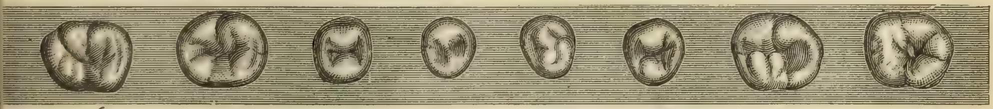
RIGHT. **UPPER.** LEFT.



1	2	3	4	5	6	7	8
$3.50.	$3.50.	$2.50.	$2.00.	$2.00.	$2.00.	$3.50.	$3.50.



THICKNESS OF THE GOLD CUSPS.

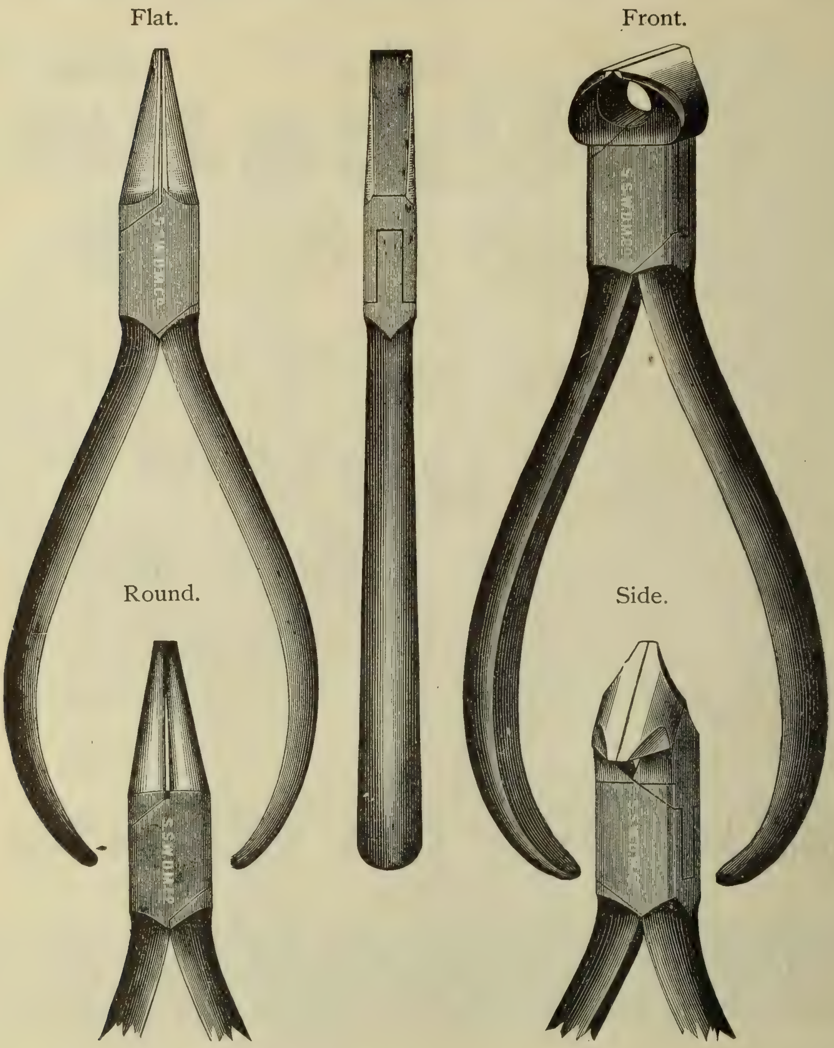


16	15	14	13	12	11	10	9
$3.00.	$3.50.	$2.00.	$2.00.	$2.00.	$2.00.	$3.50.	$3.00.

LEFT. **LOWER.** RIGHT.

Made of 22-carat gold, and designed to be soldered to seamless or other gold bands fitted to the natural tooth-roots in the mouth. Also intended to form the masticating surfaces of porcelain crowns in bridge-work.

SOLID STEEL PLIERS AND NIPPERS.



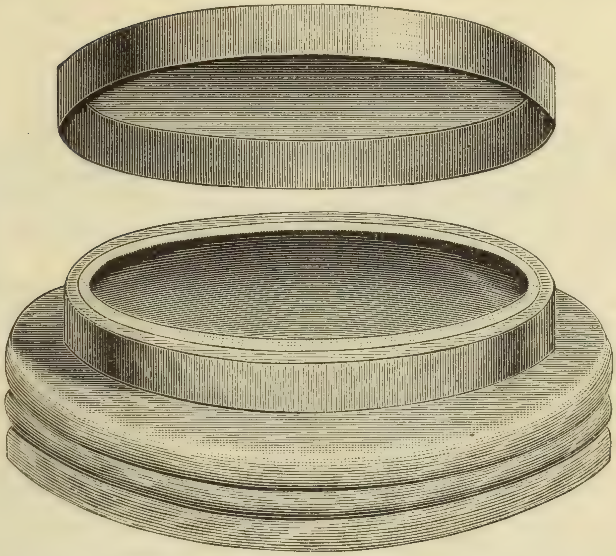
In offering this fine line of Pliers and Nippers we wish to call attention to two important points: First, they are of steel throughout, the ordinary appliances of their class having iron handles with steel-faced points. Second, the finely proportioned and neatly and smoothly wrought-out handles afford firmness of grip with a comfortable "feel," the ends being rounded off so as to avoid cutting or bruising the hand when pressure is applied.

The Nippers, both front and side, are made in two sizes, 4 and 4½ inches; the Pliers in three sizes, 4, 4½, and 5 inches.

PRICES.

Nippers, Front or Side, 4 and 4½ inches . . .	per pair,	$0.80
Pliers, Flat or Round Nose, 4 and 4½ inches . .	"	.50
" " " " 5 inches . . .	"	.55

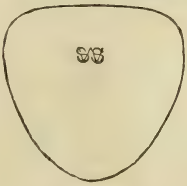
BORAX SLATE.



Dr. Evans in his "Artificial Crown- and Bridge-Work" says that the most suitable flux for delicate soldering operations is borax ground with water to a cream-like consistence. The appliance which is here offered as a substitute for the slates ordinarily used is handy and cleanly for the purpose. It consists of a shallow, saucer-shaped glass dish with a ground surface let into a wood block, which has a metal cover.

Price . . . . each 35 cents.

AIR-CHAMBER PATTERNS.



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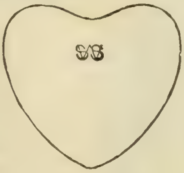

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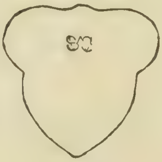

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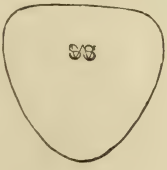

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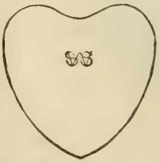

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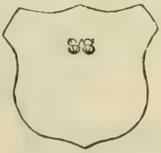

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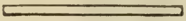
Thick.

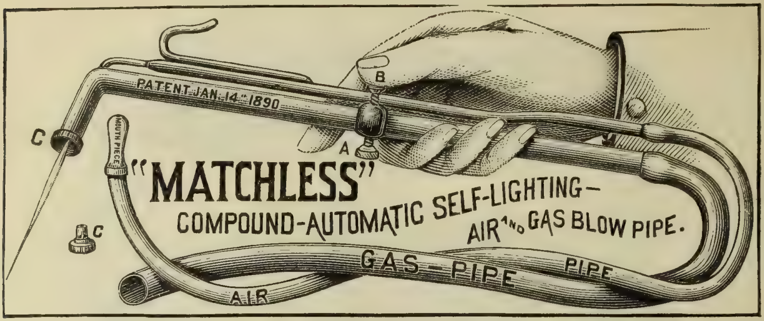


Thin.

Each form of our Air-Chamber Patterns is made in both thicknesses, affording practically a choice of twelve styles. They are put up in boxes containing a dozen each, either of separate numbers or assorted thin or assorted thick.

Price, Thick . . . . per doz. 25 cents.
" Thin . . . . " 20 "

"MATCHLESS" BLOW-PIPE.



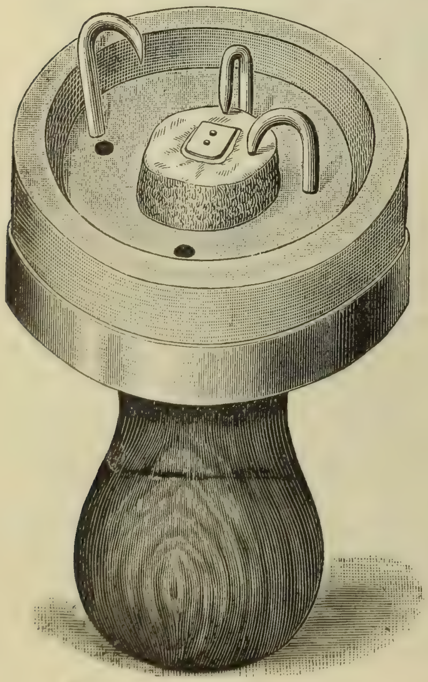
The inventor claims for the "Matchless" Blow-pipe that it is "the most powerful form made, and gives the most perfect flame yet produced." One of its principal merits is the combination of the automatic spring-valve B, and a movable adjusting-nut A. The flow of the gas is thus under perfect control. By pressing the spring-valve with the thumb, the pressure can be varied at will, and in case of a long operation, when the pressure is adjusted properly, a turn or two of the adjusting-nut fixes it at that point. The advantage in the saving of gas is apparent. A small screw-nozzle is provided for cases requiring a fine needle-point flame.

The "Matchless" Blow-pipe can be used with power, or when this is not at hand, as a mouth blow-pipe, for which purpose three feet of air-pipe are supplied without extra charge.

Price $2.50

THE S. S. WHITE DENTAL MFG. CO.,
Sole Agent for the Dental Trade and Dental Uses.

The Handy Soldering Tray and Investing Material.

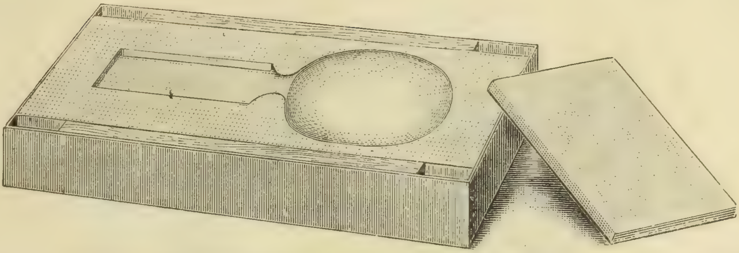


This appliance consists of a circular asbestos soldering block or tray, with raised rim, set in a brass box mounted on a wood handle. Four holes are drilled through the bottom of the asbestos for the reception of brass pins to hold the work in place. The base of the wood handle is flat, so that the appliance can be held in the hand or set upon the work-bench. With the Tray and included in the price we supply a box of investing material made of a prepared asbestos fiber, which has the advantage over plaster of Paris, that the flame can be thrown upon it at once upon the completion of the investment without risk of cracking it, saving the time necessary to dry out plaster. This investing material is simply dampened—so much of it as is to be used—until the fibers cohere, forming a plastic lump, into which the work is pressed as shown in the illustration.

Price, Handy Soldering Tray, including box of Investing Material . 90 cents

Asbestos Soldering Blocks.

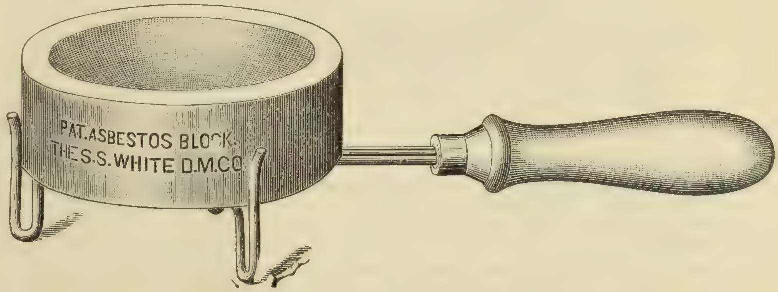
No. 1.



No. 1. Asbestos Soldering, Melting, and Ingot Block, 6 inches long, 2½ inches wide, ½-inch thick. Each Block is put up in a tin box with directions for use.

Price	each 50 cents.

No. 2, with Handle.


PAT. ASBESTOS BLOCK.
THE S.S. WHITE D.M.CO.

No. 2. Asbestos Soldering Block, 4½-in. diameter, 1¾-in. high. Concave top. We have recently devised a handle for the No. 2, adding greatly to its convenience. The Handle is sold separately, and the Block can be used either with or without it.

Price, No. 2, with Handle	85 cents.
" " without Handle	60 "
" Handle separately	25 "

FLUXED GOLD SOLDER FILINGS.

The use of Gold Solder in the form of Filings was at once recognized as a practical advance. At the suggestion of Dr. George Evans, we have recently made a still further improvement, by the addition of the proper proportion of Flux to the Filings.

By the uniform distribution of the Flux throughout the mass of the Filings, they are ready for immediate use as sold. In the new form all the advantages of ready fusing and easy manipulation are retained, and in addition a saving of time, a certainty that the Flux will be wherever the Filings are placed and will not be where it is not wanted, are assured. This uniform fluxing is a safeguard against the liability of melting thin portions of crowns in soldering.

Put up in 1-dwt. bottles.

PRICES.

Fluxed Gold Solder Filings, 18 k.	per dwt.	$1.00
" " " " 20 k.	"	1.10

Dr. Gilbert Walker's
Vulcanizable "Granular Gum" Facing.

Patented January 1, 1889.

J. W.

Gilbert Walker's
"Granular Gum."
Rubber Facing.

TRADE MARK

& Co

This material is a decided improvement upon the solid color of pink rubbers for facings. When vulcanized, polished, and wetted (as by the saliva) it approximates the appearance of the well-known continuous-gum work, and as there are several shades, the dentist can either match the natural gum adjoining the artificial gum of the partial denture, or suit the color of a full denture to the complexion of the patient, as circumstances may require.

"Granular Gum" vulcanizes with any dental rubber, and a very thin facing is sufficient. Wrapped in tin foil and put up in envelopes containing one ounce, which will serve for four full sets. Directions with each package.

PRICES.

No. 1.	Mottled Granular Gum	per ounce $1.00
No. 2.	Purple Tint Dark Granular Gum . .	per ounce $1.15
No. 2A.	" " Light " " . .	
No. 3.	Florid " Dark " " . .	
No. 3A.	" " Light " " . .	

THE ELECTRO-DEPOSIT PLATE.

It is the most perfect-fitting dental plate made. It is a silver plate covered with pure gold.

It is made by depositing pure silver and pure gold directly upon the plaster model, and necessarily secures a *perfect* fit of the model.

Send a perfect model, marked just as you wish the plate, and the plate will be returned to you, ready for you to attach your teeth with rubber. It can be soldered, and if a break occurs it can be repaired as good as new.

Give full instructions, and, to secure prompt attention, send $10.00, the price of plate, with the order.

E. E. CLARK,
17 West Park Street,
NEWARK, N. J.

DENTAL RUBBERS.

In the preparation of rubbers for the use of dentists we have insisted on the same painstaking care in every step that has given our products in other directions the reputation they enjoy. As a consequence, we claim for those which are recognized as being distinctively ours, that they are the best in their various classes.

BOW-SPRING RUBBER.

Trade-Mark, No 1847, Registered June 23, 1874.

Of this rubber, when first put upon the market, sixteen years ago, we said:

"This rubber is made of the best Para gum, carefully selected, is thoroughly freed from foreign substances, and is manufactured by improved processes. It contains more gum to the pound than ordinary rubbers,—having less specific gravity,—and is cheaper to the user: first, because it **takes more sheets to make a pound;** and second, because, being much stronger, it can be made into thinner plates. It will, by reason of its fine texture, receive and retain a high polish. **We believe it to be the best gum on the market."**

We are still willing to affirm all that we then said concerning this matchless rubber, and we believe that the verdict of the dental profession will sustain us. We feel certain that, were it possible to get a correct statement of the quantity of the different varieties sold during the last sixteen years, the Bow-Spring would be found to "lead all the rest." It is still the same high-class rubber it was when first introduced to the profession.

PRICES.

Less than 10 lbs. . . per lb.	$2.75	In 25 lb. lots . . . per lb.	$2.00
In 10 lb. lots . . . "	2.25		

S. S. White's Dental Gum, No. 1 Improved.

This rubber is of a lower grade than the Bow-Spring, and while it therefore requires less care in vulcanizing, it produces a plate of great strength. It has long been esteemed one of the very best of the cheaper grades, by reason of its easy working qualities, and the satisfactory results achieved with it. It is to-day just as it always was.

PRICES.

Less than 10 lbs. . . per lb.	$2.25	In 25 lb. lots . . . per lb.	$1.90
In 10 lb. lots . . . "	2.00		

The S. S. White Dental Mfg. Co.'s Pink Rubber.

The low price which we have put upon our Pink Rubber is in accordance with our rule to give customers their share of any reductions we may be able to make in the cost of production. In desirable qualities for the limited uses to which Pink Rubber is put—color and toughness—it is equal to the best of the higher-priced brands on the market. Its qualities can be readily tested at slight expense by those who are not familiar with its merits. Put up in half-pound boxes.

PRICES.

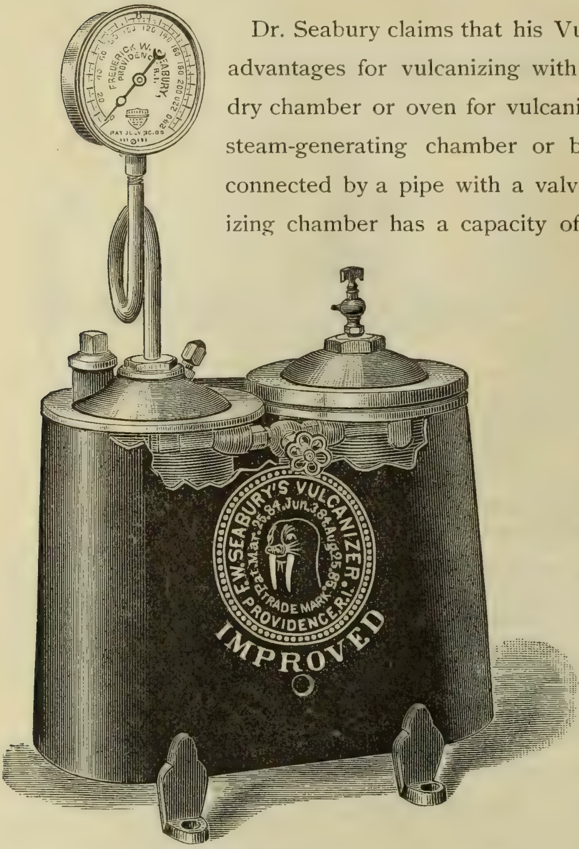
Per lb.	$5.00	In 5 lb. lots . . . per lb.	$4.75
		" 10 " . . . "	4.50

We also sell the leading rubbers of other makers at manufacturers' prices.

THE S. S. WHITE DENTAL MFG. CO.

Improved Seabury Dry-Steam Vulcanizer.

PATENTED.



Dr. Seabury claims that his Vulcanizer affords all the advantages for vulcanizing with dry steam. It has a dry chamber or oven for vulcanizing, distinct from the steam-generating chamber or boiler, the two being connected by a pipe with a valve cut-off. The vulcanizing chamber has a capacity of three flasks. In the illustration the jacket is cut away to show the relative positions of the two chambers and their connection.

It is also claimed by the inventor that this machine saves time and rubber; that plates made in it are sufficiently strong when only half as thick as when vulcanized in the ordinary way, and that they can be cured in less time; that cases can be removed and others inserted with a delay not to exceed five minutes; that a perfect fit is insured, as the plates are prevented from warping because the plaster remains intact.

The machine, as sold by us, has been improved by forming the chambers of a much heavier metal, and by the addition of a safety plug, adjusted to blow out long before the limit of resistance is reached.

A GAS BURNER

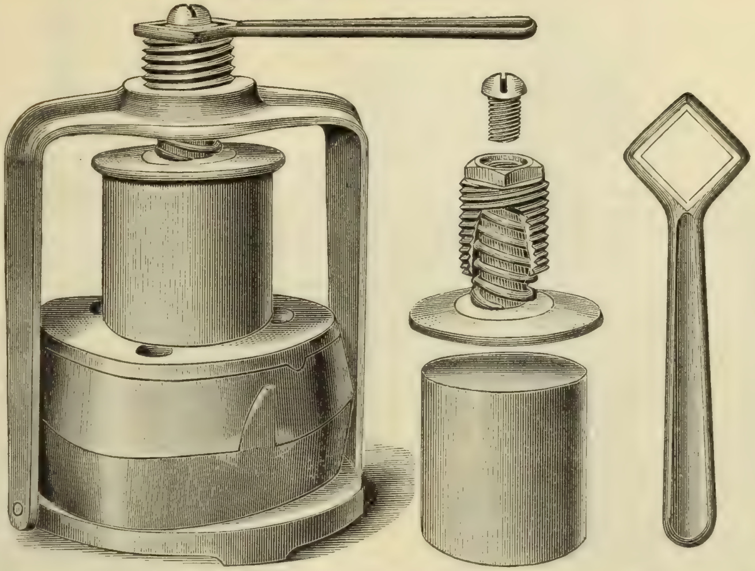
(see cut) is included in price.

PRICE.

Improved Seabury Dry-Steam Vulcanizer $30.00

THE SEABURY RUBBER COMPRESS.

PATENT APPLIED FOR.



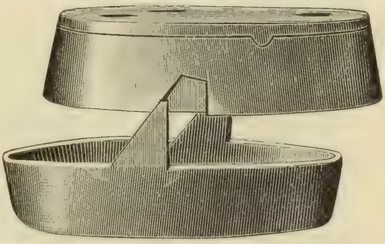
Designed to close the flask, with a uniform pressure, in the vulcanizer, when the rubber melts, at about 250° Fahr. When this Compress is used, the rubber is under pressure constantly during vulcanization and when cooling, and there is no necessity for closing the flask while the rubber is firm. This Compress produces a tough, dense plate, uniform in texture and thickness, without liability to spread the teeth or crack the blocks or investment.

Made for two or three flasks. The cut shows a two-flask Compress.

Price, including Lever and Block $2.00

THE SEABURY DENTAL FLASK.

Patented January 30, 1883.



The Seabury Dental Flask has neither bolts nor springs, but is closed upon a guide. When used with the Compress the pressure is thus evenly applied all over, and insures a plate of even thickness, without disturbing the articulation.

Price $1.50

HARD WAX FLUX FOR SOLDERING.

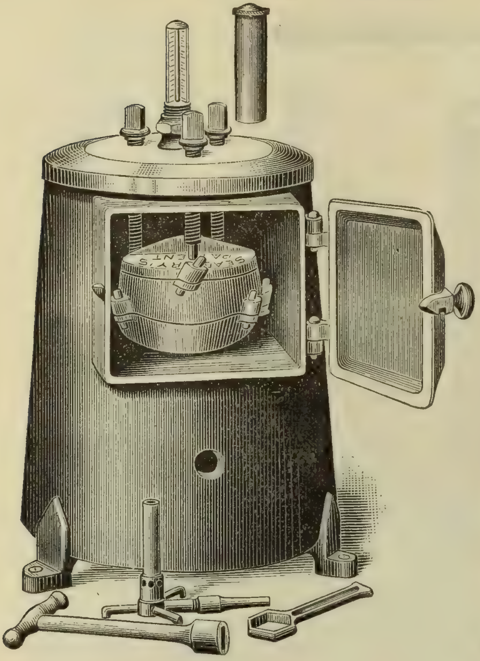
Prepared from formula of Dr. H. A. PARR.

A wax preparation which is tough and adhesive when heated and exceedingly rigid when cold, and which possesses also the properties of a flux. It will be found useful in crown- and bridge-work and in ordinary plate-work for temporarily cementing different parts to be soldered, as when the wax is melted out the flux which it contains is deposited where needed in the soldering operations.

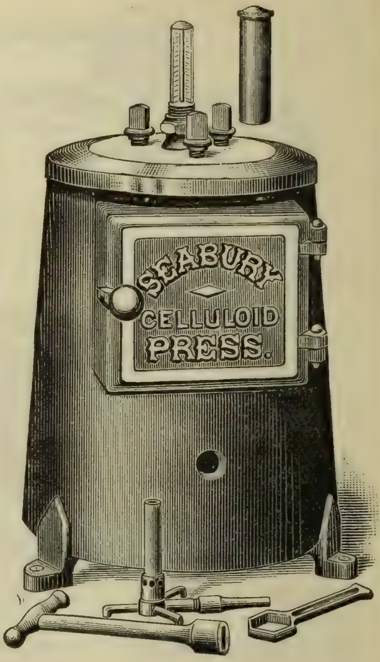
Put up in quarter-pound boxes.

Price . . . . per box 50 cents.

The Seabury Dry-Heat Celluloid Apparatus.



OPEN.



CLOSED.

Dr. Seabury, who has spent much time and labor in experimenting in the working of celluloid, reaches the conclusion that it should be molded in a dry chamber. The apparatus above shown was devised to carry out his ideas as to the proper method of manipulation. The molding-chamber is heated by dry heat, which is under perfect control.

One of the most important features is the flask, which is made of bronze and contains a number of devices found desirable in working celluloid. The guide-pins are made inclined and removable, to facilitate opening the flask and prevent the plaster investment from being broken. A dovetail lock is provided, so that the flask when closed can be removed from the heater and left to cool without the use of a vise or clamp. The flask is closed by three screws passing through the roof of the molding-chamber. The pressure can thus be adjusted exactly to the needs of the case in hand so as to produce a dense plate.

Dr. Seabury claims that properly manipulated, celluloid is the lightest, strongest, cleanest, and healthiest base for artificial dentures; and that it is easily adapted, readily repaired, and durable.

PRICE.

Apparatus, complete, including Inclined-Guide Removable-Pin Lock-Flask, two Wrenches, and Gas-Burner		$20.00
Extra Flasks	each	5.00

PLAIN PINS FOR BONWILL CROWNS.

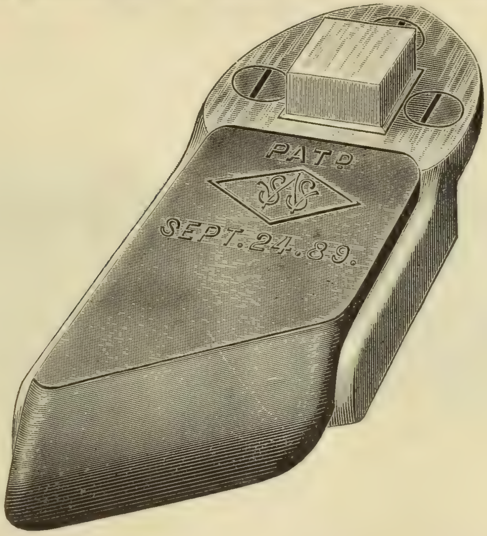
The serrations in the Pins for the Bonwill Crowns having proved an element of weakness, they were long since abandoned and the Pins made plain, thus allowing the placing of more metal where most needed. When the Pins are to be set with gutta-percha or oxyphosphate of zinc, a few shallow cuts made with a sharp knife near the point, turning up the edge of the metal, answer every purpose; when set with amalgam, none are required, as the Pins become amalgamated and firmly united.

PRICES.

No. 1, Square, small size	each	12 cents.
" 2, Angular, large size	"	15 "

BENCH BLOCK.

Patented September 24, 1889, by Dr. E. R. MAGNUS.



The advantages of this unique device, which is destined to meet with universal favor, are appreciable at a glance. The frame is made of cast iron (gray nickel finish) surmounted by a chilled face anvil. It carries a thick block of par-vulcanized rubber, which for the purposes of a filing-block is claimed by the inventor to be greatly superior to any other material. The frame can be fastened to the laboratory or office bench by the three screws which accompany it.

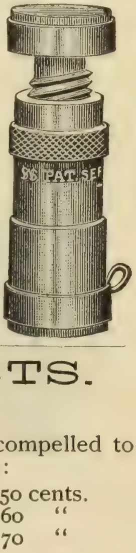
The rubber Blocks can be replaced when worn.

There are two sizes, designated as large and small. The large size is 5 inches long over all by 2¼ inches wide. The small size is 4⅜ inches long by 1⅝ inches wide.

Price, either size	each $1.25
Rubber Blocks, separately	" .35

Daintree's Adjustable Mouth-Prop.

PATENTED SEPTEMBER 10, 1889.



This Mouth-Prop combines facility of lengthwise adjustment to suit the "open" of the jaws with a spring which affords the necessary elasticity. With the spring compressed the length at the shortest adjustment is $1\frac{3}{16}$ inches; at the longest, 1½ inches. One head screws into the body, around which the other swivels, an elastic spring being confined between the swiveling head and the body. The heads are cushioned with cork, and there is a ring for the attachment of a retaining cord.

Price, Nickel-plated $1.25

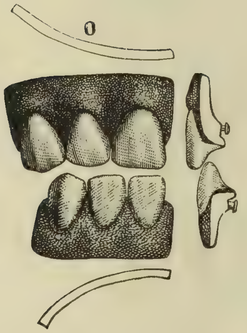
CROWN-METAL POSTS.

Advance in Prices.

Owing to the continued rise in the price of platinum, we are compelled to advance the price of Crown-Metal Posts to the following figures:

AA	each 50 cents.
A	" 60 "
B	" 70 "

Chart of Gum Sections, Upper and Lower, from Sets of 28.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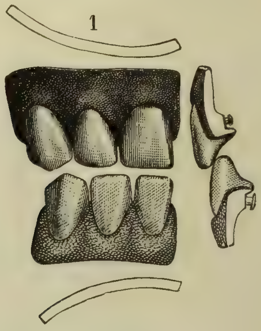
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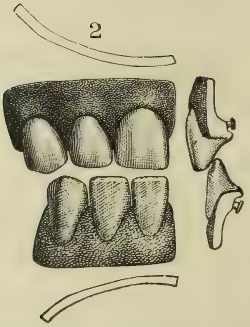
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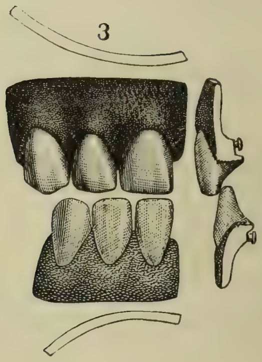
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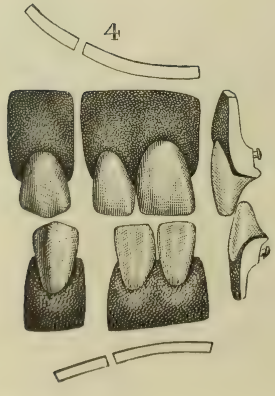
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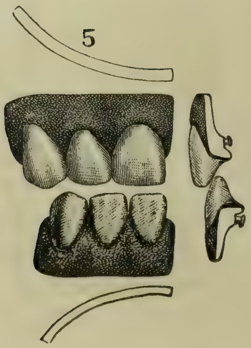
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Chart of Gum Sections, Upper and Lower, from Sets of 28.

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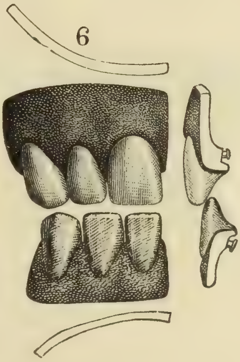

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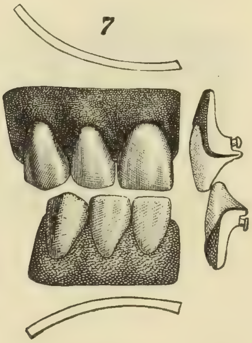

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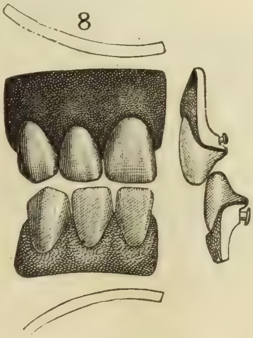

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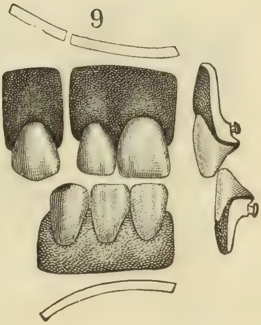

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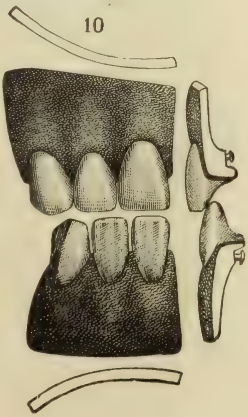

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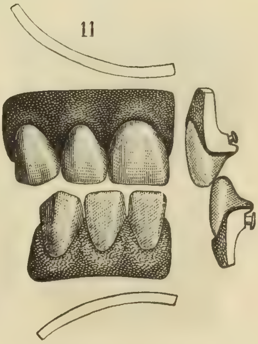

Chart of Gum Sections, Upper and Lower, from Sets of 28.

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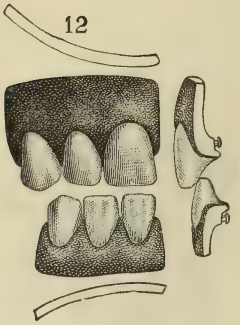

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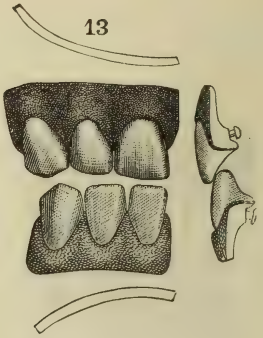

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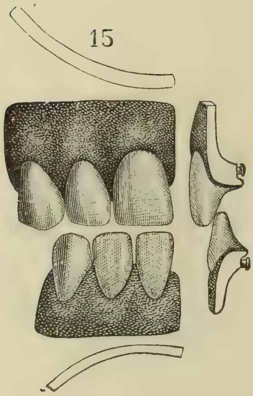

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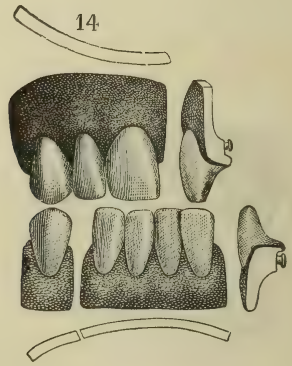

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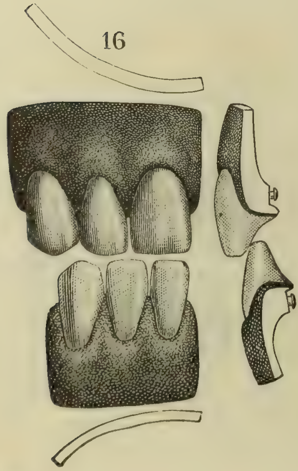

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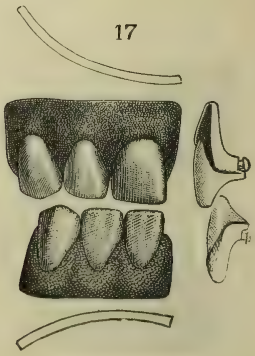
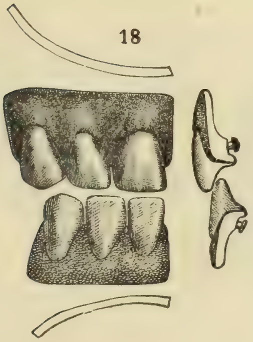


Chart of Gum Sections, Upper and Lower, from Sets of 28.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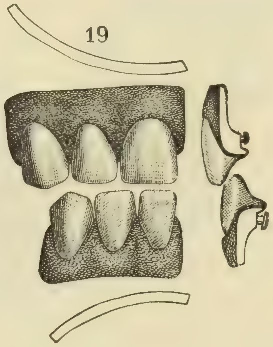
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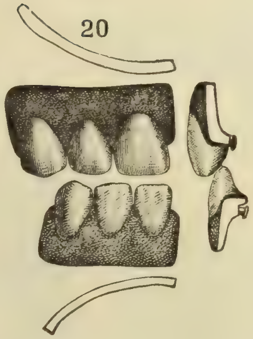
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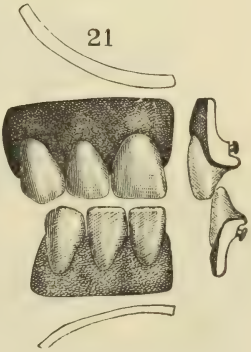
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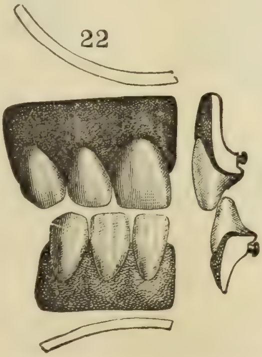
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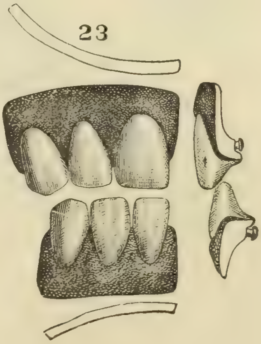

23

DR. PARR'S FLUX,

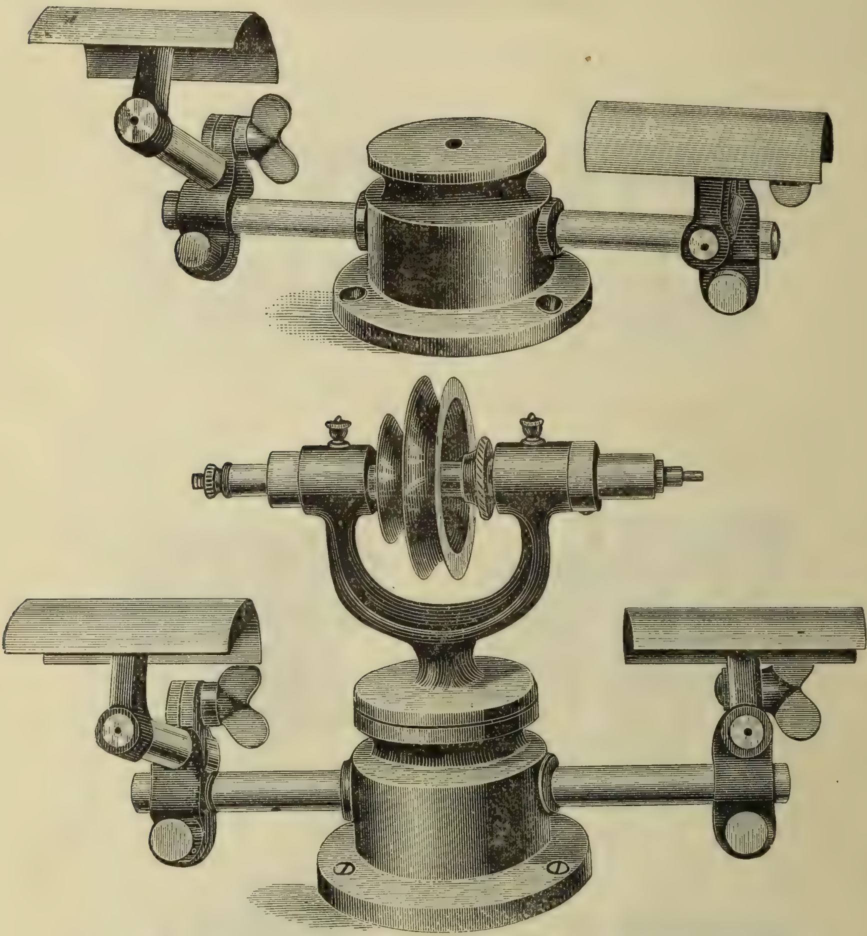
For Gold, Silver, Crown- and Bridge-Work.

This Flux is vitrified and pulverized ready for use. It is carefully prepared and free from slag, sand, and other impurities.

Put up in boxes, *directions on each.*

Price . . . . per box $1.00

Adjustable Hand-Rest for Lathes.



This appliance consists of two Adjustable Rests at either end of a bar passing through a metal stand upon which the Lathe-Head is mounted before fastening to the table. The Rests can be adjusted to any position required for work on either end of the Lathe-Head. They are held firmly in place by means of squeeze-nuts.

The adjustable Hand-Rest is adapted for the Cone-Clutch, Lawrence, and "Best" Lathe-Heads.

PRICES.

Adjustable Hand-Rest	$4.00
Mounted with Clutch Lathe-Head, as shown, including 10 Chucks,	17.00

Lawrence or "Best" Lathe-Heads may be substituted at value.

HANDY BINDER FOR DENTAL COSMOS.

Subscribers who have their yearly volumes of the Dental Cosmos bound for permanent preservation doubtless sometimes find the numbers more or less dogseared when they gather them together at the end of the year. The use of a Handy Binder will keep them as neat and shapely as when they first come to hand.

Price	each 50 cents.

REDUCTION IN PRICE,

VELVET GOLD CYLINDERS.

Trade-Mark "Velvet Gold."

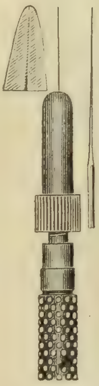
Velvet Gold is one of the most conspicuous in the line of gold preparations of which we said in October, that they "have, practically without advertising, not only held their own, but have actually distanced all competitors."

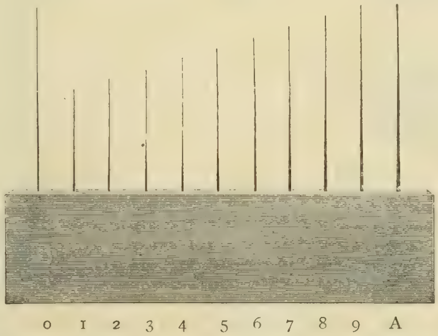
The growth in the demand for this beautiful form of Gold enables us to shade the price in ounce and half-ounce lots. Our list is therefore as follows :

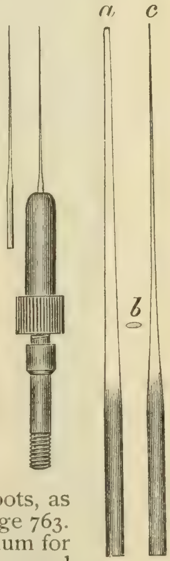
Price	$\frac{1}{16}$-oz.	$2.25
"	⅛-oz.	4.50
"	½-oz.	17.00
"	1-oz.	34.00

Put up in $\frac{1}{16}$-oz. packages in Nos. 1, 2, 3, 4, 5, 6, and assorted.

How's Root-Canal Probe, Pluggers, Dresser, and Gauge Chuck.







The Probe No. 0 is round, spring temper and very fine. The Pluggers Nos. 1 to 9 are oval as seen in the magnified illustrations, *a* showing the face, *b* the cross-section, and *c* the edge. They are made of polished spring-tempered steel extremely thin, with squared ends to carry the filling-material—shreds of tin-foil—to the apices of the roots, as described by Dr. How in the October DENTAL COSMOS, page 763. The Dresser, No. A, is of like form, but made of iridio-platinum for dressing roots or sulci with acids on cotton, which is readily wrapped on the flattened point. The chuck is also a gauge, and measures the exact depth of the canal while holding the plugger with a firm grip.

PRICES.

Nos. 0 to 9	each	$0.25
No. A	"	.50
Gauge Chuck	"	1.25
The set		4 00

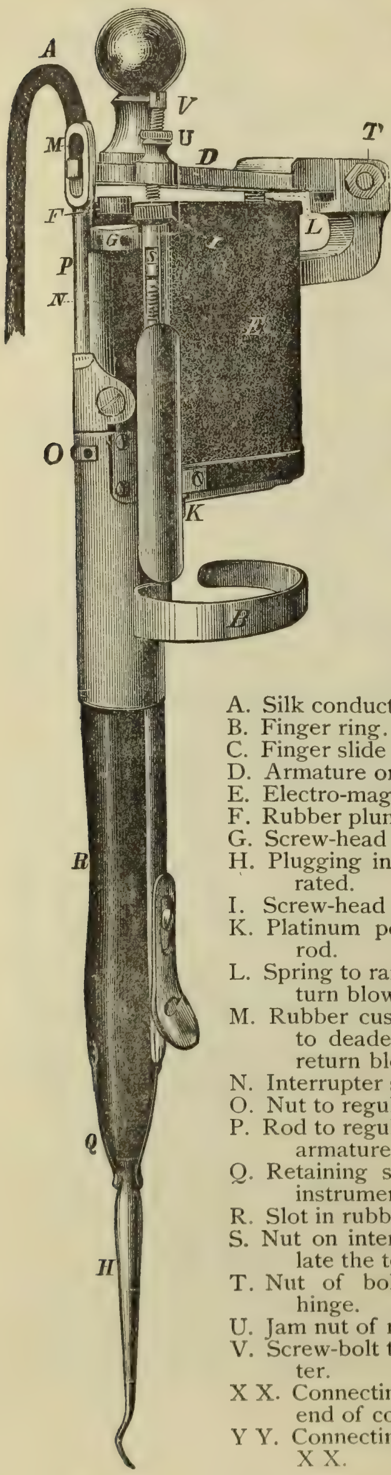
Dr. Robert Richter's Glass Inlay Materials.

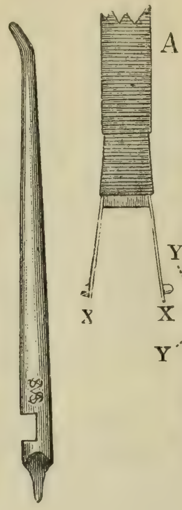
The manufacturer, Mr. E. Simonis, of Berlin, Germany, has made us sole agent for the sale of the Glass Inlay Materials in this country, and he informs us that the European demand is already considerable and rapidly increasing.

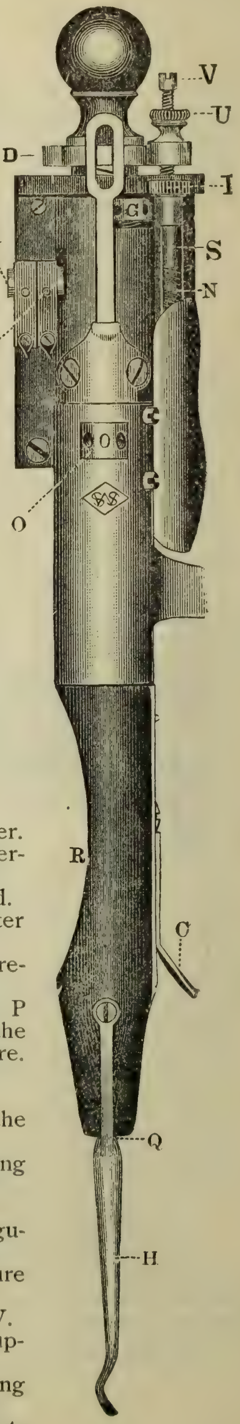
Complete set, seven different shades, with samples	per box $7.50

The Bonwill Electro-Magnetic Mallet,

FIG. 1. **With Modifications made by Marshall H. Webb.** FIG. 2.







A. Silk conducting cord.
B. Finger ring.
C. Finger slide to close circuit.
D. Armature or mallet.
E. Electro-magnets.
F. Rubber plunger.
G. Screw-head to regulate plunger.
H. Plugging instrument, finely serrated.
I. Screw-head of interrupter rod.
K. Platinum points of interrupter rod.
L. Spring to raise armature for return blow.
M. Rubber cushion in the stem P to deaden the sound of the return blow of the armature.
N. Interrupter spring.
O. Nut to regulate rod P.
P. Rod to regulate the stroke of the armature.
Q. Retaining springs for plugging instrument.
R. Slot in rubber handle.
S. Nut on interrupter rod to regulate the tension of spring.
T. Nut of bolt of the armature hinge.
U. Jam nut of regulating screw V.
V. Screw-bolt to regulate interrupter.
X X. Connecting points or spring end of conducting cord.
Y Y. Connecting plates for points X X.

The Bonwill Electro-Magnetic Mallet,

WITH

Modifications made by Marshall H. Webb.

Patented Jan. 26, 1875; Dec. 14, 1875; Feb. 15, 1876; Oct. 15, 1878. Reissue July 13, 1880.

This Mallet combines the most valuable inventions of Drs. Bonwill and Webb. It needs no words of encomium to commend it to those who are familiar with its merits. It is indorsed by many of the most skillful operators in the world. When properly understood it will be found to approach more nearly the ideal condensing instrument than any other ever offered to the profession.

Some of the principal advantages are:

First.—The blow is delivered upon the packing-instrument just when its force is greatest, because the attraction of the magnets increases constantly as the mallet approaches them until the circuit is broken.

Second.—The force of the blow can at all times be controlled by the operator.

Third.—Properly used, it condenses the gold thoroughly and evenly throughout the entire filling.

Fourth.—Gold may be impacted against thin, frail walls with ease, and without fracturing the enamel.

Fifth.—It saves the operator time and the fatigue attendant upon the use of a hand, automatic, or foot-power mallet.

Sixth.—When its operation is understood and the battery is kept in order as per instructions which accompany each Mallet sold, the instrument cannot fail to give satisfaction.

PRICES.

Mallet with Connecting-posts, seven feet Silk Cord, one Plugger Point, Key Wrench, and Leather Case . .	$35.00
The same, with Four-Cell Partz Acid Gravity Battery . .	55.00
" " " " " " " . .	65.00

We can furnish the Electro-Magnetic Mallet, on order, with a socket fixed in the hand-piece to carry points such as are made for the automatic mallets. This style of socket, having a spiral spring inside the hand-piece, dispenses with the use of the springs at Q. Price, $2.00 extra.

Finely serrated instruments should always be used with the Electro-Magnetic Mallet, the blows being so rapid that ordinary or coarse-serrated instruments will chop the gold.

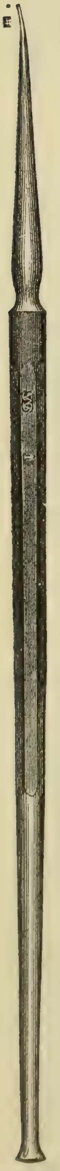
CAUTION.

No oil must be placed where it can by any possibility interfere with the proper working of the interrupter. Oil gums, and it is besides a non-conductor of electricity; the least film will, therefore, form an insulator, and break the circuit. We have had mallets returned to us as out of order in which the only trouble was oil. A drop of the finest oil [Dental Engine Lubricant is the best] may be applied to the hinge-joint T of the armature, to the two points where the springs Q Q touch the plugger-point, and to the slot in the rod P, but no other part requires it.

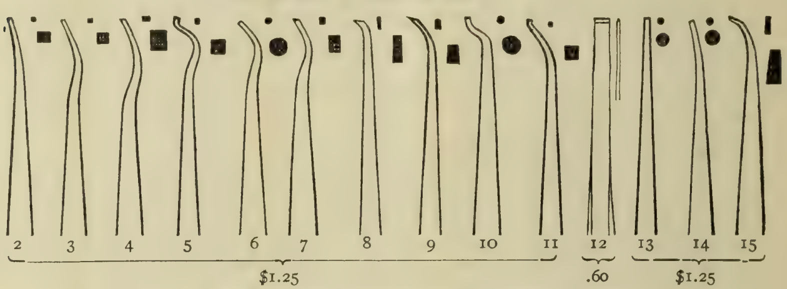
Fine Pluggers for the Electric Mallet.

To present this large variety of points for the Electric Mallet we have grouped together several sets of finely serrated Pluggers which we have frequently been called upon to make as "specials." Nos. 1 to 15 are the set devised by the late Dr. Marshall H. Webb, containing all the original points and those added at subsequent revisions by himself and Dr. C. S. Wardwell. Following these are the well-known instruments of Drs. Knowles, Varney, Nicklin, and Chappell, and additional forms by Dr. T. S. Waters, Dr. E. Parmly Brown, and Dr. H. J. McKellops.

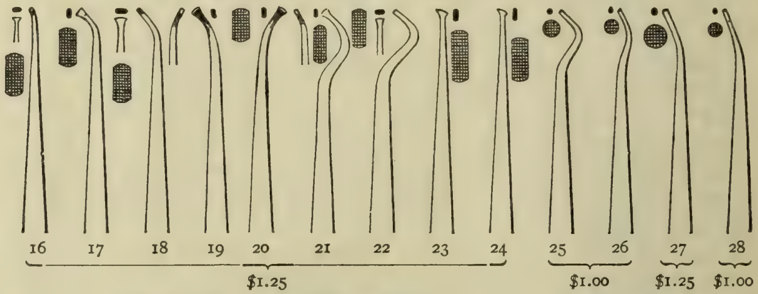
Fine blued handles.



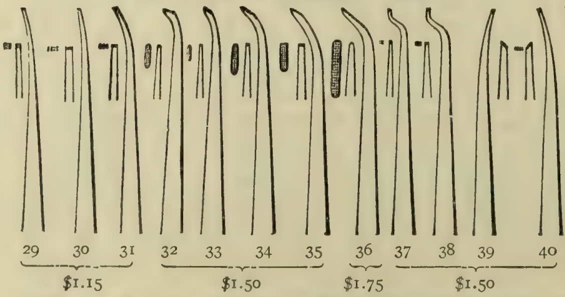
DR. M. H. WEBB'S SET.



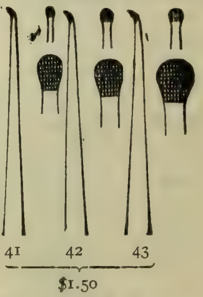
DR. S. E. KNOWLES'S "CLUB-FOOT" SET.



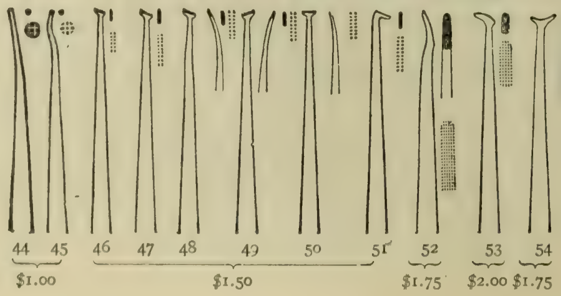
DR. R. W. VARNEY'S SET.



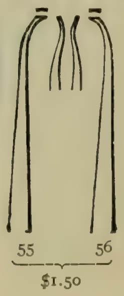
Dr. T. L. Nicklin's Set.



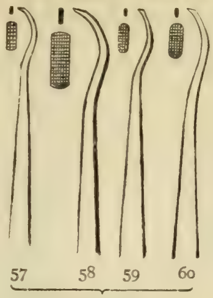
DR. M. H. CHAPPELL'S "GOLD-BUILDERS."



Dr. T. S. Waters's.

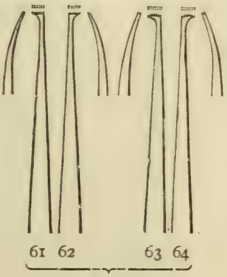


DR. E. PARMLY BROWN'S.

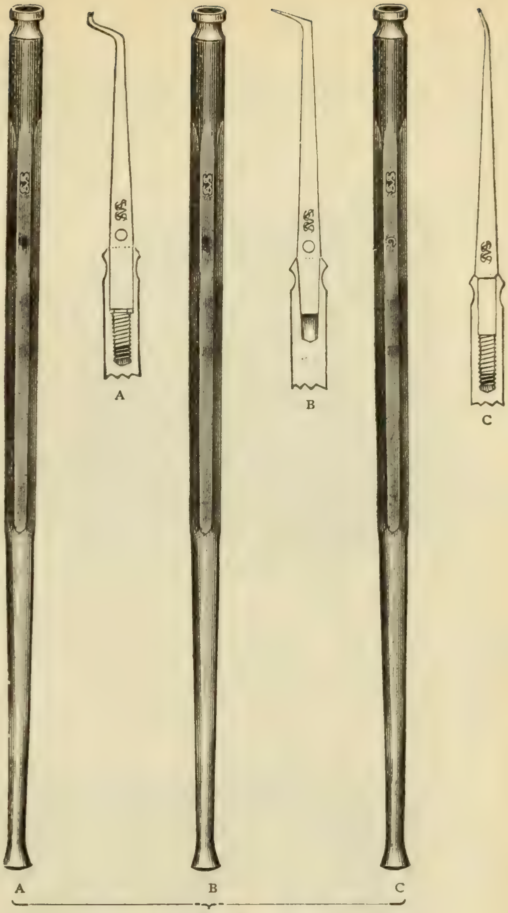


$1.75 each.

DR. H. J. McKELLOPS'S.



$1.50.



SOCKET HANDLES.

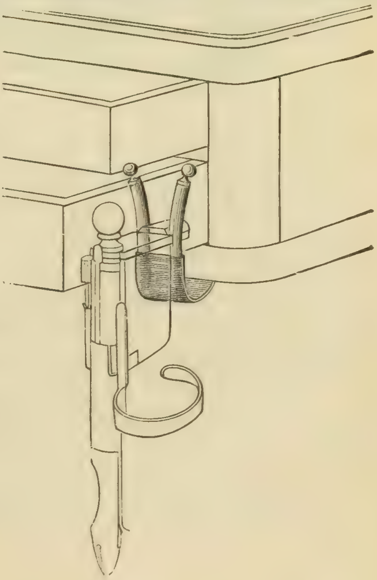
“A,” Socket for Snow & Lewis Plugger-Points
“B,” “ “ Salmon “ . . . . each $0.75
“C,” “ “ Cone-Socket “

ELECTRO-MAGNETIC MALLET HOLDER.

Suggested by Dr. T. J. THOMAS.

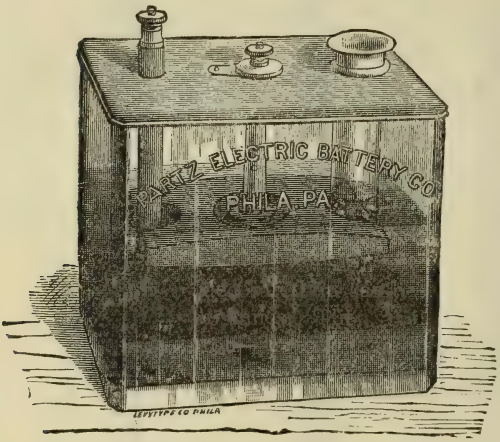
A very convenient device for holding the Electric Plugger within easy reach of the operator's hand. It can be readily attached to the bracket table or to any convenient ledge.

Price $1.60



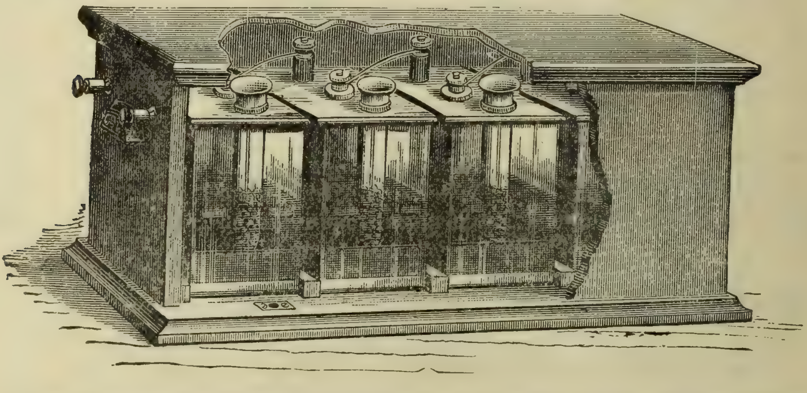
PARTZ ACID GRAVITY BATTERY

FOR THE BONWILL ELECTRO-MAGNETIC DENTAL MALLET.



The Partz Acid Gravity Battery is offered as the best for running the electro-magnetic mallet. The cells are of the Bunsen type, with the gravity principle applied to them.

The advantages claimed are that the cells do not need to be emptied oftener than once in two or three months, and meanwhile their full strength may be maintained by supplying them from time to time with "sulpho-chromic salt," a product in which sulphuric acid has been caused to combine with chromic acid in an amorpho-crystalline state. The zincs suffer so little from local action that they may always be left immersed, unless the apparatus is not to be used for weeks or months, when they may be raised and suspended over the liquid, for which purpose their stems are provided with holes for the insertion of pins above the covers. There is no forming of chrome alum so long as the sulpho-chromic salt is not supplied greatly in excess of the quantity required.



The electro-motive force of a cell charged according to directions accompanying each Battery is 1.95 volts; its strength of current is 3 ampères.

Four such cells are generally found sufficient for operating a dental mallet, though occasionally a stronger current is desired and five or six cells are employed. The consumption of sulpho-chromic salt by four cells in daily use is from 1 to 2 pounds per month.

When it is found expedient to supply the cells with a fresh solution of sulphate of magnesia, the carbons should be rinsed in hot water. The zincs should be cleansed with dilute sulphuric acid and reamalgamated twice or thrice a year.

Price of single Cell, complete	$3.50
Price of set of 4 Cells in Black Walnut Box	20.00
Price of set of 6 Cells in Black Walnut Box	30.00

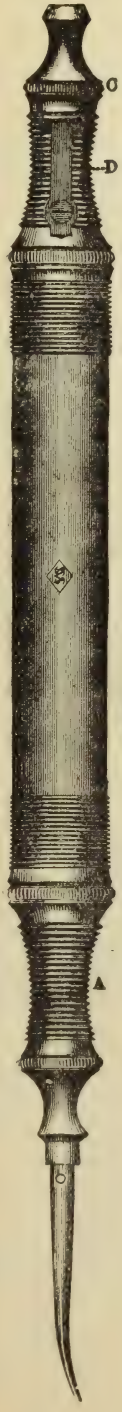
The Boxes are neatly finished and provided with handles and outer pole screws.

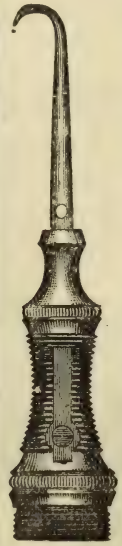
Sulpho-chromic Salt, 2 pounds, in jar with screw-cap . 75 cents.

This salt being hygroscopic, must be guarded against moisture.

Sulphate of Magnesia, in 11-oz. pkgs. . . . per pkg. 5 cents.

THE ABBOTT AUTOMATIC MALLET.





Patented in Great Britain and United States,

August 16, 1887.

The Abbott Automatic Mallet was designed especially to avoid the defects of other appliances of its class. It is simple in construction and combines with the usual direct blow a back-action movement, actuated by the same mechanism, so that with it gold can be packed into cavities in almost any position in the mouth.

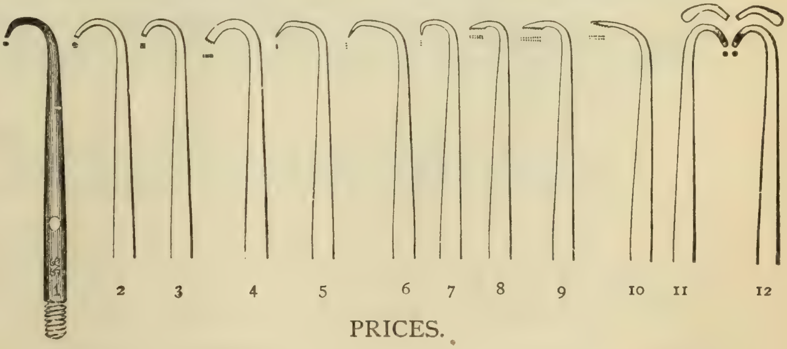
The working parts—pivotal latch, tripping mechanism, hammer, and spring—are entirely free from the case, being carried upon a spindle which passes centrally through it. This plan of construction avoids friction. Each end of the spindle is socketed for the reception of the plugger points, one end giving the direct push or thrust-blow, the other the pull or back-blow.

The Mallet combines simplicity of construction with easy, effective operation.

All the parts liable to wear are made of hardened steel, and the instrument throughout is constructed in the best manner.

For the direct blow the Cone-socket or Snow & Lewis points, either of which will fit the socket, may be used. For the back-action blow, Dr. Abbott has devised the set of points shown herewith. It is believed they will cover all requirements.

Price, Nickel-plated $9.00



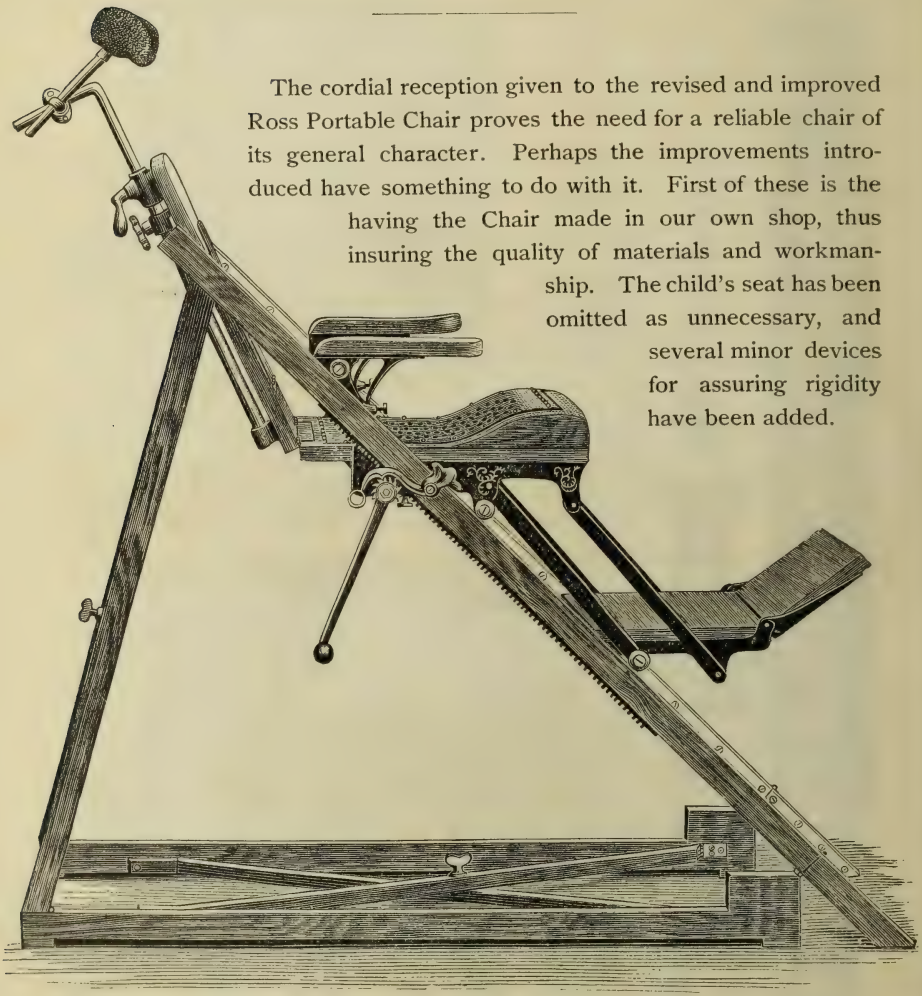
PRICES.

Nos. 1 to 7 inclusive	each	$0.40
" 8 to 12 "	"	.50
Set of 12 Points		5.25

The Ross Portable Dental Chair.

Patented July 19, 1881; August 24, 1886.

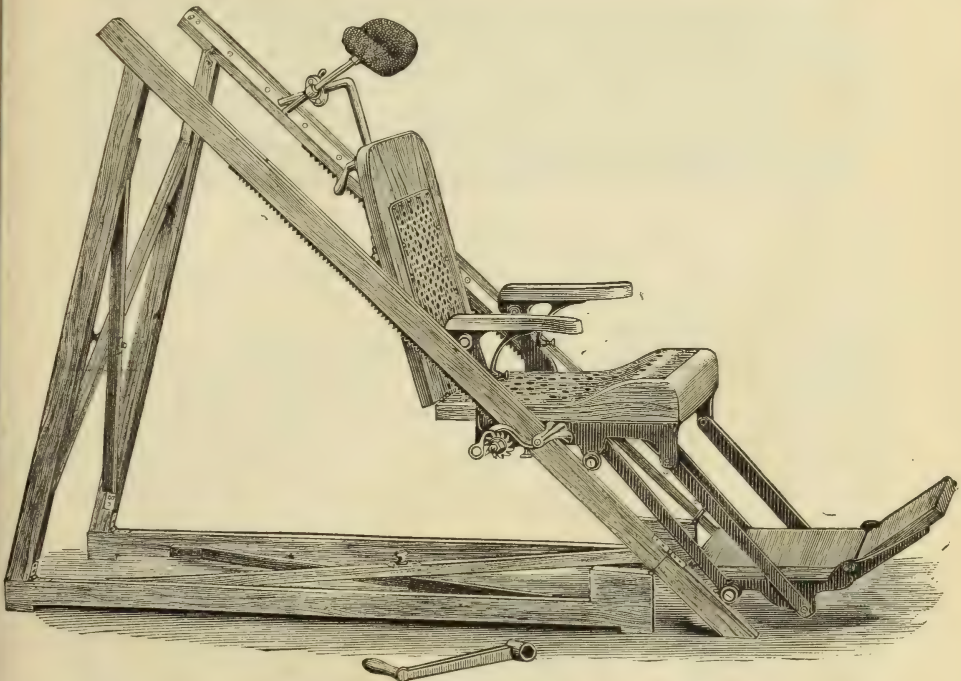
The cordial reception given to the revised and improved Ross Portable Chair proves the need for a reliable chair of its general character. Perhaps the improvements introduced have something to do with it. First of these is the having the Chair made in our own shop, thus insuring the quality of materials and workmanship. The child's seat has been omitted as unnecessary, and several minor devices for assuring rigidity have been added.

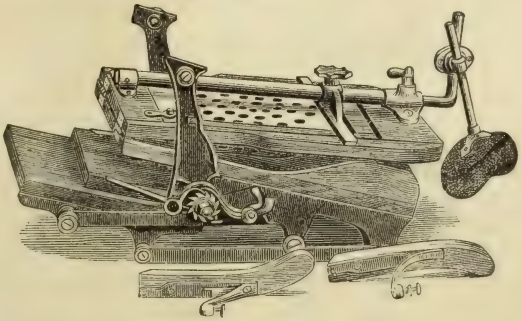


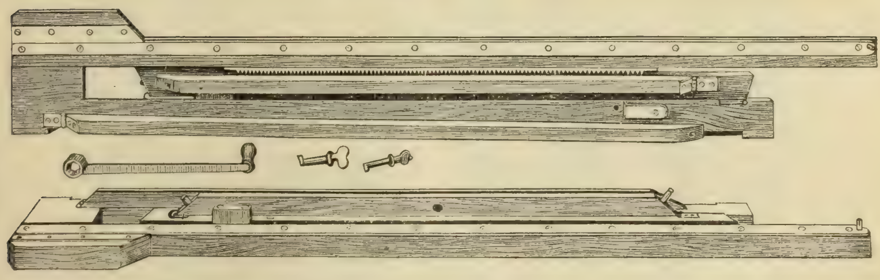
A light, strong, convenient Operating Chair, designed especially for traveling dentists. In its lowest position the seat is seventeen inches from the floor; in its highest, thirty-four inches, giving it a vertical range equal to that of the Morrison Chair. The footstool is thirteen inches below the seat and is fixed to it.

The weight of this Chair is about seventy pounds, and it is readily taken apart and packed in a small space (see opposite page). It is made of wood, strengthened with iron. The frame is of black walnut, oil-finished. The seat and back are of perforated wood, and the head-pad is upholstered in plush.

The Ross Portable Dental Chair.







The cuts show the Chair in its highest and lowest positions; also, the parts folded ready for packing. Space occupied when folded,—by the body, 30½ x 20 x 13½ inches, and by the frame, 55½ x 5½ x 8 inches.

Price (boxing included) $65.00

No. 2 Socket fits this Chair, and any of our spittoons and spittoon brackets can be used with it.

ECONOMY IN RUBBER-DAM.

RUBBER DAM
BEST QUALITY
MADE ESPECIALLY FOR
THE S. S. WHITE DENTAL MFG. CO.
PHILADELPHIA,
NEW YORK, BOSTON, CHICAGO, BROOKLYN.

Everybody knows that free atmosphere and light are the worst foes of Rubber-Dam. Given fine quality Rubber-Dam, guard it from heat, light, and air, and trouble over "rotten" rubber will be reduced to the minimum.

The Dam we sell is the best on the market, and in the (almost) air-tight decorated tin can here offered, the dentist has a perfect protection against its enemies. Then, again, the form in which it is put up—a long, narrow strip or roll—saves time and rubber. A snip of the shears, and just what is needed is ready for use, while the remainder goes back into its can until wanted.

Two sizes of cans are used, yard and half-yard. The yard can contains a roll seven inches wide and five yards long; the half-yard, half the length of the same width. That is, equal to a yard or a half-yard respectively of our regular 35-inch wide Rubber-Dam, and of the same quality.

PRICES:

Roll Rubber Dam, Thin, per yard Can	$1.00
" " " " " half-yard Can	.50
" " " Medium, per yard Can	1.50
" " " " " half-yard Can	.75
" " " Thick, per yard Can	2.00
" " " " " half-yard Can	1.00

RUBBER-DAM CLAMPS.

Let no one imagine because we advertise only a few of our Rubber-Dam Clamps, that therefore we make only those shown in the pages following. The fault is not in our stock, but in our limited space for advertising. We shall be glad to send a pamphlet catalogue containing full descriptions and illustrations of the entire line to any dentist wishing to receive it who will send his address.

Bonwill's Plastic Gold Alloy, with Prepared Mercury.

This Alloy, with the special Mercury which accompanies it, is offered to the profession as a superior filling-material, and as admirably adapted for pivoting porcelain crowns. The large percentage of gold which it contains causes it to harden quickly, making a more solid mass from the very first, insuring the permanence of the crown, and giving a good color to it and the root. When properly mixed it works like a stiff putty, making the contouring of fillings without a matrix an easy operation.

Price, per package, containing ¼-oz. each of Alloy and Mercury, $1.75

LAVA STRIPS.

A superior article for finishing fillings. These Strips are tough and strong, and not readily affected by moisture. Two grades, coarse and fine.

No. 1, Coarse	per box 20 cents.
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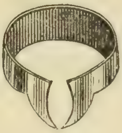
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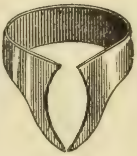
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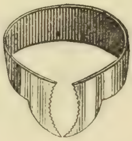
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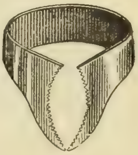
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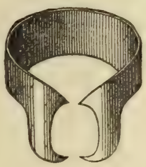
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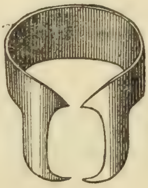
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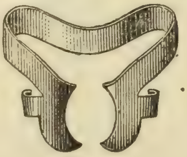
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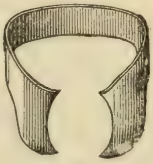
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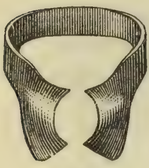
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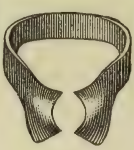
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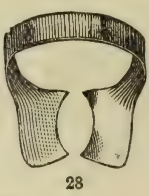
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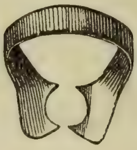
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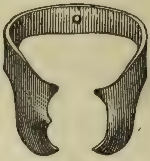
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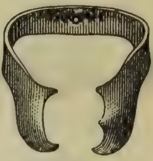
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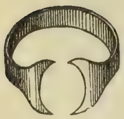
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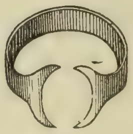
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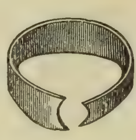
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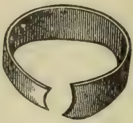
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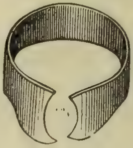
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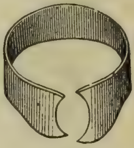
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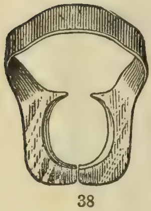
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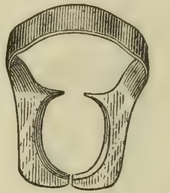
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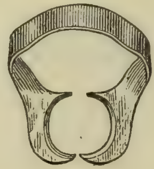
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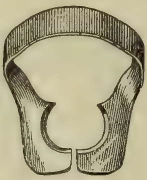
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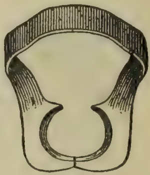
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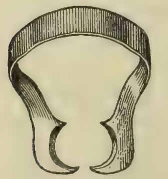
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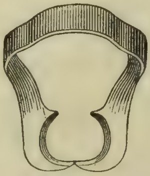
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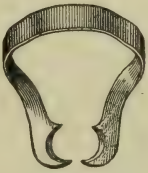
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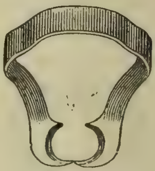
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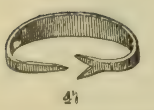
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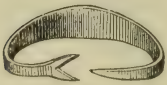
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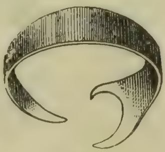
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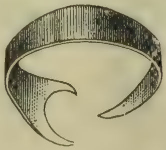
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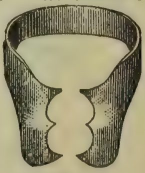
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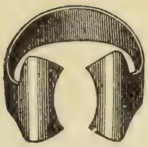
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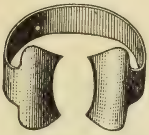
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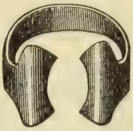
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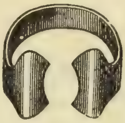
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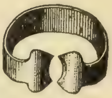
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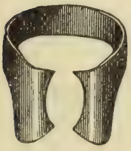
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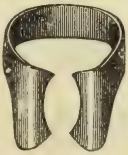
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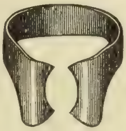
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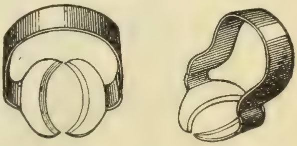
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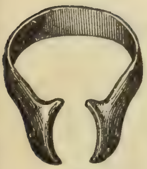
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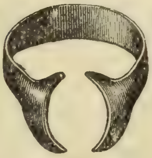
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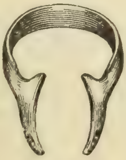
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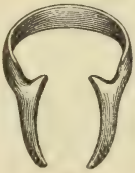
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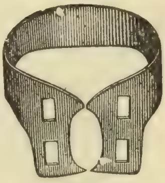
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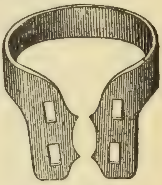
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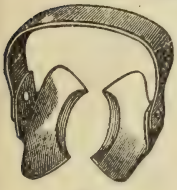
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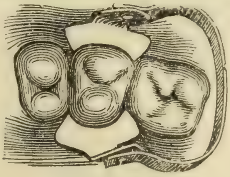
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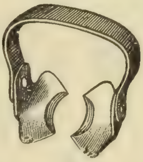
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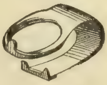
DR. J. F. P. HODSON'S.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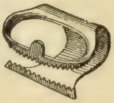
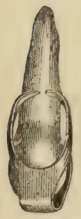

71

80 cents each.

DR. W. W. EVANS'S "INCISOR AND BICUSPID."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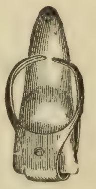
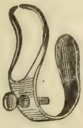

73

80 cents each.

DR. W. W. EVANS'S "INCISOR AND BICUSPID" WITH SET SCREW.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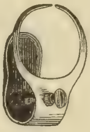
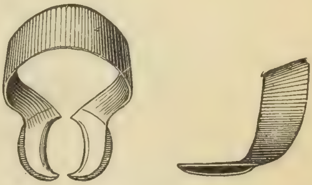

75

$1.00 each.

DR. HICKMAN'S.


76

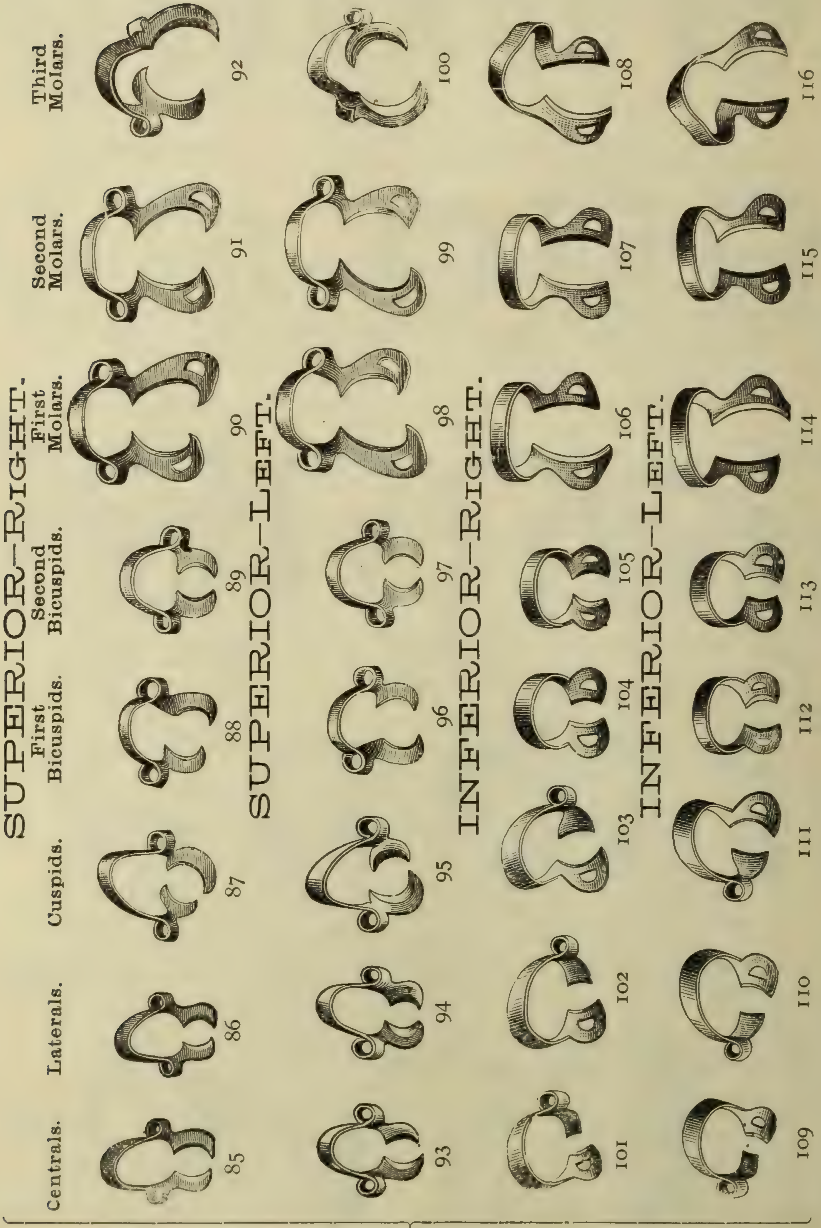
90 cents each.

Illustrated pamphlet sent on application.

RUBBER-DAM CLAMPS.

DR. DELOS PALMER'S SET OF 32.

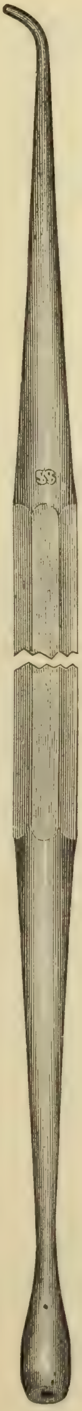
Patented June 22, 1875.



60 cents each.

Illustrated pamphlet sent on application.

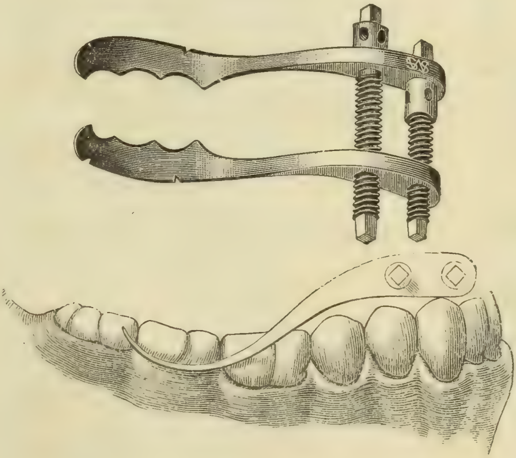
Universal Rubber-Dam Screw-Clamp.



Patented December 26, 1876, by Dr. E. Parmly Brown.

Dr. Brown uses this Clamp to the exclusion of all others, claiming that it is universal in its application. It may be adjusted to any tooth in the mouth, holding the rubber-dam securely, wherever placed. It clasps several teeth at the same time, permitting the performance of permanent operations on loose or tender teeth, or upon molars not fully erupted. Cavities beyond the line of the gum can be exposed by proper adjustment of the points. It affords the operator a firm support for the fingers, and avoids risk of injuring the gums or rubber-dam during the operations of chiseling and filing, and while using engine burs and disks. It allows the patient to close the mouth at intervals during an operation, and can be so adjusted as not to inflict any pain. The adjusting-screws may be worked with either end of the key.

No. 117.

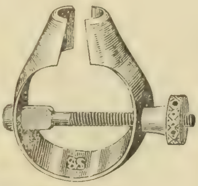


Price, Clamp and Key, Nickel-plated $3.75

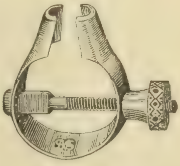
NEW ROOT-CLAMPS FOR CROWN-WORK.

Suggested by E. L. Hunter, D.D.S.

These are not, strictly speaking, Rubber-Dam Clamps, but are more properly adjusters for the application of the dam to roots upon which porcelain crowns are to be fitted. After the thumb-screw is adjusted so that the Clamp slides easily over the root, the points are passed through the proper opening in *thin* rubber-dam, carried well under the gum and secured firmly with the thumb-screw. The dam is next adjusted over the adjoining teeth, carried beyond the cone-shaped ends of the Clamp with a waxed silk ligature and tied there; after which the Clamp is removed, leaving the dam in position.



No. 118.



No. 119.

Price . . . . each $2.00

T. A. LONG'S RUBBER-DAM CLAMPS.

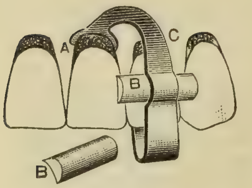
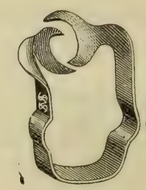
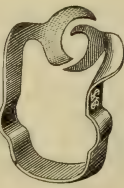


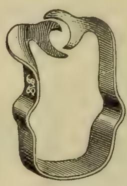
FIG. 1.



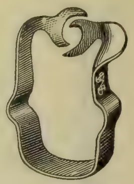
120



121



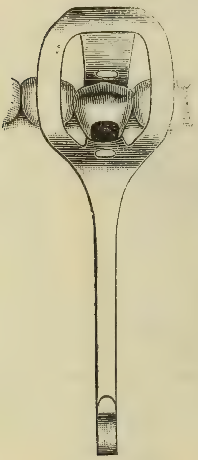
122



123

Clamps Nos. 120–123 are specially designed to push and hold the rubber-dam clear beyond the margins of labio-cervical cavities. They are in pairs, and are applicable to all the teeth except the molars. Fig. 1 shows the method of use. B is a block, cut to suit, which holds the jaw of the Clamp firmly beyond the cavity A. The larger pair are for centrals and cuspids; the smaller for laterals and bicuspids.

Price . . . . each 50 cents.



124

JOHNSON'S LEVER CLAMPS.

Patented September 20, 1887.

For use in filling cavities which extend under the gum margins of incisors, cuspids, and bicuspids. A tongue or clasp engages with the point of the tooth, and a gum-retractor projecting from the body of the Clamp pushes the gum above the cervical margin of the cavity. The side of the Clamp is elongated to form a lever, at the end of which is a loop through which an elastic ligature is passed, being fastened around the patient's head or neck. The inventor claims that the Clamp is easily adjusted and that the gum is not disturbed except at the point where the work is to be performed, where the Clamp acts as a protector. The lever holds the lip out of the way, a desideratum in operations especially on the lower teeth.

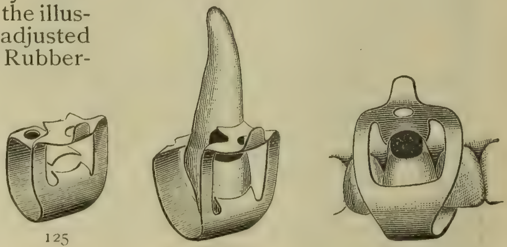
Price . . . . each $1.00

NOTE.—The Lever Clamp is best applied by means of the Universal Rubber-Dam Clamp Forceps.

HOW'S CERVIX CLAMP.

Patented May 1, 1888.

The use of the Cervix Clamp in holding back the gum from a cavity in the tooth-neck is made obvious by the illustrations. The Clamp is best adjusted and removed by the Universal Rubber-Dam Clamp Forceps, but it may be placed upon the tooth, and the cavity be clearly exposed without them by passing loops of twine through the clamp holes, and using both hands to pull the Clamp open.



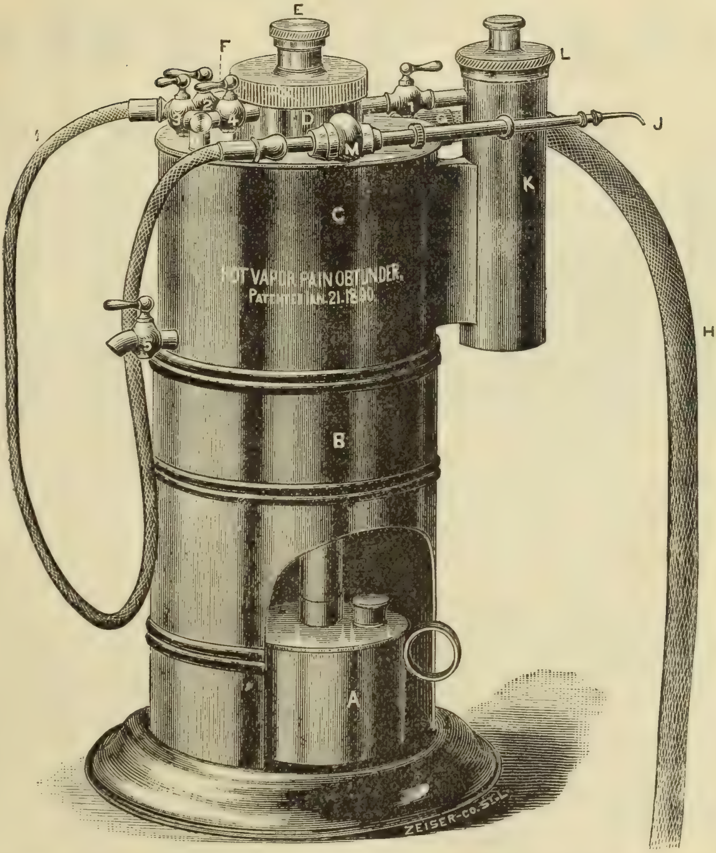
125

Price . . . . each $1.00

HOT VAPOR PAIN OBTUNDER.

Patented January 21, 1890.

Devised by Dr. S. A. Milton.



Dr. Milton presents a novel idea as to the best way of obtunding sensitive dentine, and he has constructed the neat little apparatus shown above to demonstrate the correctness of his theory, which is, that the oils of cloves, cinnamon, and cajuput, also eucalyptol, thymol, and campho-phenique, and other medicaments, vaporized and applied at the normal temperature of the human body (say 98° F.), directly upon the sensitive surface, will deaden the sensibility and enable the operator to proceed without pain to the patient.

The apparatus consists essentially of a water-heater, a medicating chamber, a volatilizer, a lamp for heating, and the necessary tubes, stop-cocks, etc. Dr. Milton lays stress on applying the medicament with force, and to this end the apparatus is attached to a foot-blower or a cylinder of nitrous oxide or compressed air. Air forced through the tube passes through a worm in the water-heater, mingles with the vaporized medicament, and is thrown forcibly upon the sensitive surface. By the turn of a stop-cock or two pure warmed air alone can be applied, thus affording an excellent hot-air syringe.

The apparatus has many other uses which will suggest themselves to the experienced dentist, but its main purpose is the obtunding of sensitive dentine, and to this end the vapor should be kept at about 98°. The inventor does not claim invariable success, but he asserts positively that more uniformly satisfactory results attend the use of this apparatus than any other means or method heretofore used. Directions accompany each apparatus sold.

Price, Nickel-plated	$30.00

THE S. S. WHITE DENTAL MFG. CO., Sole Agent.

CAULK'S FILLING-MATERIALS.

GRAY. YELLOW. LIQUID. MEDIUM. LIGHT.

FOUR COLORS and LIQUID.—Gray, Yellow, Medium and Light, $2.00 per Pkg.
TWO COLORS and LIQUID.—Gray and Yellow, ... 1.50 " "
ONE COLOR and LIQUID.—Gray, Yellow, Medium, Light or Gum, 1.00 " "

The Powder (any color) and Liquid of Caulk's Diamond Cement sold separately, at 50 cents per bottle.

Twenty years ago I conceived the idea of making a cement for filling teeth. I first made a study of the oral fluids and chemical effect produced by acids and alkalies on fillings in the mouth. After a long series of tabulated experiments, noting the results of the same in private practice, was evolved what has been known for nearly **fifteen years** as **Caulk's Diamond Cement,** or an **Insoluble Basic Phosphate.** Its success has been almost phenomenal—as it has been in continuous use by the dental profession generally, in the United States, and been exported for many years to nearly every clime upon the globe. It has held its own against all competitors throughout the world, and now stands at the head of this class of filling-materials.

SOME OF ITS MAIN CHARACTERISTICS.

As a **Tooth Saver** it stands unequaled. It will harden in water or saliva, and by some chemical action hardens the dental tissue. It clings or sticks to the tooth-substance, permeates the tubuli, excludes moisture, and prevents the return of caries—hence its great value in the treatment of sensitive dentine, lining cavities and strengthening weak walls previous to the introduction of metallic fillings ; and, it being a non-conductor of thermal changes, prevents shock to the pulp. It is now regarded as a durable and permanent filling-material when the proper mouths and positions are selected for its insertion.

IN CROWN- AND BRIDGE-WORK,

and porcelain inlays it has no **superior,** as its hydraulic properties render it invaluable for these operations.

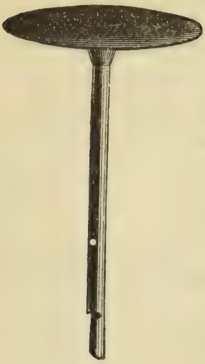
Great improvement has been made in the shades, colors now being **darker,** and more **tooth-like** in appearance.

Two or more colors blended together (in mixing) will produce any shade desired.

All of Caulk's Filling-Materials are sold by Troy Weight, and sent by Mail.

L. D. CAULK, Manufacturer, Camden, Delaware, U. S. A.

BROWN'S MOUNTED GRANITE DISKS.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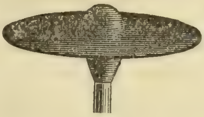
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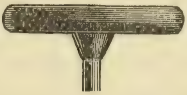
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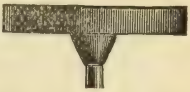
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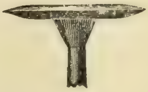
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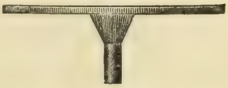

8

Having accepted the sole agency for these Disks under an agreement with Dr. B. S. Brown, we present the Disks made by him for dental purposes, using his own statement as to their valuable features.

Dr. Brown claims that they are made of the best sapphire corundum, in three grades: fine, medium, and coarse. They are made and mounted in one operation on *straight mandrels only*.

Nos. 1 and 2 are knife-edged Disks,—one with an acorn-shaped hub, the other with a V-shaped hub. When the Disk is worn out or broken, the edges can be dressed down so as to leave the hubs as useful shapes of points.

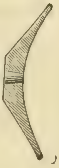
Nos. 3 and 4 are round- and square-edge stump-wheels.

Nos. 7 and 8 are for opening large spaces between teeth.

PRICES.

Nos. 1, 2, 3, 4, 7	15 cents each.
No. 8	20 " "

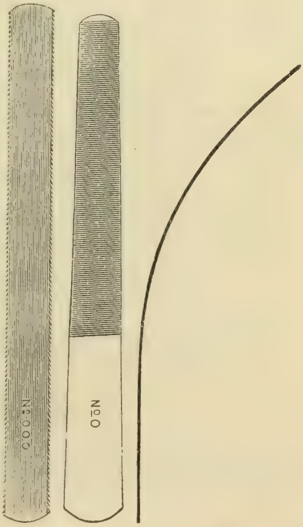
CUP-SHAPE CORUNDUM DISK.



This additional Corundum Disk is an enlarged and modified form of the well-known No. 11 Corundum Point. It will be found convenient in dressing off roots for crowning, etc., and it has the indorsement of well-known crown- and bridge-workers.

Price . . . . per doz. 75 cents.

Flexo Separating Files and Saws.



The advantages claimed for the Flexo Separating Files and Saws are, that they are thinner, and while they are tempered so hard that they will cut as rapidly as the ordinary files, they can be bent without breaking and will stay bent so that they can be readily adapted to the shape of the tooth they are used upon, thus presenting a larger cutting-surface at one time; that they last longer than ordinary files, as there is practically no breakage, and they are therefore useful until worn out.

Being made of steel, the Flexo Files cannot be bent like a piece of iron wire, but by manipulating them between the thumbs and forefingers a little at a time they can be readily and quickly curved to the desired form. Used wet, they will clear themselves.

The regular numbers of the Files, 000, 00, 0, 1, 2, 3, are made with one safe side, cutting on one side and both edges. The Saws are only made No. 000, having both sides safe and cutting on edges only. The No. 000 have 125 cuts to the inch.

Price, either Files or Saws . per doz. $3.00

TEST-PAPERS FOR DENTISTS.

Very frequently it is important to the dentist to know whether his peroxide of hydrogen, which is so liable to change, is still good or has become decomposed; or whether his solution of bichloride of mercury has become inert by the reducing action of organic matter in the water under the influence of sunlight. And so of many other chemicals used in the dental office which are apt to change in strength.

Prof. Chas. Mayr, of Springfield, Mass., has prepared a series of test-papers, which will enable the dentist to learn quickly and accurately whether his preparations are good or worthless, and without the use of cumbersome methods. They are put up in neat little books, each containing eight different papers (of some, like litmus, several papers are provided), affording sixty-four different reactions. The papers are as follows:

Phenyl-Carbinol, for strong acids and alkalies.
Turmeric, for alkalies.
Sulphide, for solutions of metals.
Potassium Iodide, for H_2O_2, bichloride $\frac{1}{500}$.
Iodide Starch, for hydrogen peroxide.
Litmus, for weak acids and alkalies.
Erythroine, for salts and alkalies.
Lacmoid, substitute for litmus, not affected by carbonic acid.

Each paper has printed upon it the reactions it gives, so that even the inexperienced have a safe guide as to its uses.

Price . . . . per book 25 cents.

CHARLES ABBEY & SONS,

MANUFACTURERS OF

DENTISTS' FINE GOLD FOIL,

Nos. 228 and 230 Pear Street, Philadelphia.

The attention of Dentists is invited to our FINE GOLD FOIL, which is prepared under our constant personal supervision. Our Nos. are 4, 5, 6, and 8.

We are also manufacturing COHESIVE FINE GOLD FOIL, Nos. 4, 5, and 6.

ALL our Gold Foil is manufactured from ABSOLUTELY PURE GOLD, prepared expressly for the purpose, with great care, by ourselves.

ADDRESS **CHARLES ABBEY & SONS, Philadelphia.**

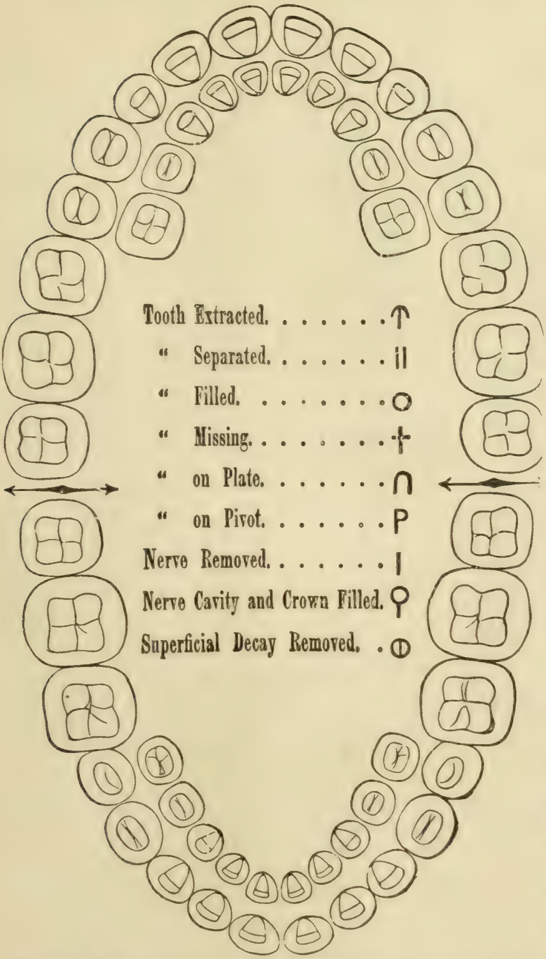
PHILADELPHIA DENTAL COLLEGE.

SPECIAL NOTICE.

By act of the National Association of Dental Faculties of the United States, to which this institution subscribes, students are not to be received for the usual two-year course after the session commencing 1890–91.

J. E. GARRETSON, *Dean.*

ALLPORT'S
REGISTERING DENTAL LEDGER.


Tooth Extracted. . . . . . . ↑
" Separated. . . . . . . ¦|
" Filled. . . . . O
" Missing. . . . . ┼
" on Plate. . . . . . . ∩
" on Pivot. . . . . . . P
Nerve Removed. . . . . . . |
Nerve Cavity and Crown Filled. ♀
Superficial Decay Removed. . Φ

A Ledger for Dentists' use, designed by Dr. Allport, of Chicago, and intended to facilitate the registering of accounts.

The annexed cut represents a diagram, of which there are two on each page, with space alongside of each, appropriately ruled for name of patient, reference, date ot operations, charge for the same, and credit for amounts paid.

The symbols denote the character and locality of the various operations performed, thus showing at a glance the history and condition of the mouth of each patient.

These books are made in neat style, printed on good paper, and substantially bound.

The Ledger has had extensive sale and is still in large demand.

PRICES.

340 pages, half Turkey, Cloth Sides	$3.50
340 " " Roan, Paper sides	3.00
172 " " " " "	2.00

Specimen pages sent on application.

Bill-heads, with Diagram same as in the Ledger, known as our Bill-Head No. 3, 8½ x 7 inches.

Dentists' Pocket Diary and Appointment Book,

FOR

REGISTERING APPOINTMENTS FOR DENTAL OPERATIONS.

MONDAY. 18

8		1	
9		2	
10		3	
11		4	
12		5	

TUESDAY.

8		1	
9		2	
10		3	
11		4	
12		5	

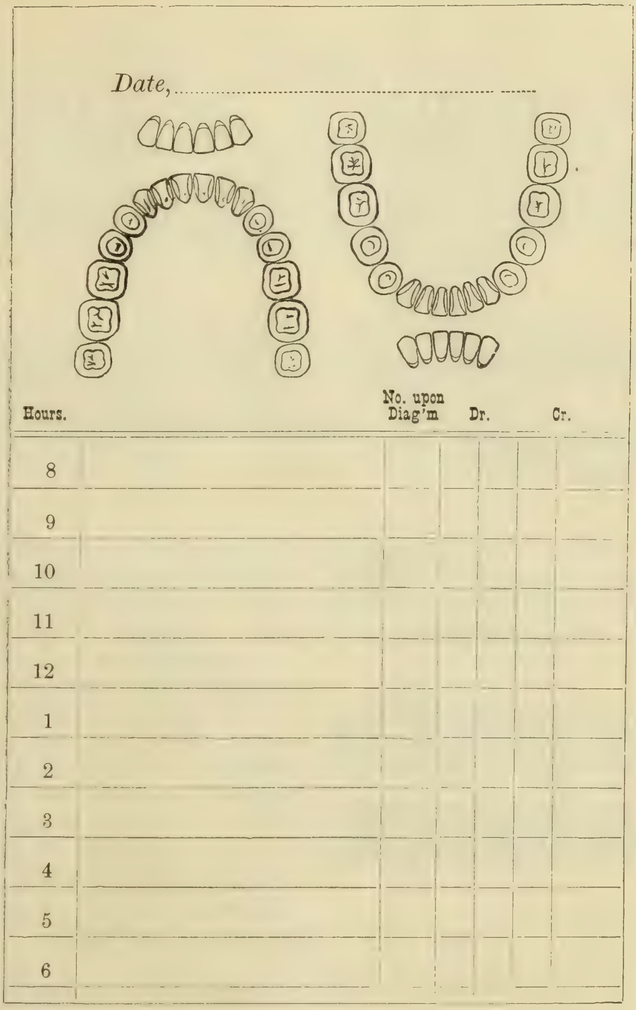
WEDNESDAY.

8		1	
9		2	
10		3	
11		4	
12		5	

The above Diagram shows the exact size and style of a page of the Pocket Diary, presenting, when open, engagements for one week. The figures denote the hour of the engagement. It contains blanks for 54 weeks, and, being without date, is good for any time. It has also a neat memorandum attached.

Flexible Cover, Gilt Edge	$0.75
" " " " with Pocket and Tuck . . .	1.00

DENTISTS' POCKET APPOINTMENT AND RECORD BOOK.



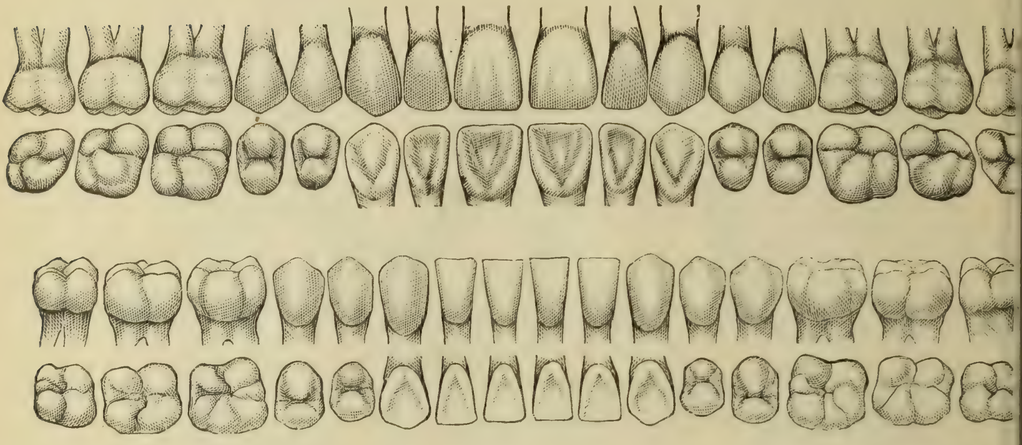
Date,..

Hours.		No. upon Diag'm	Dr.	Cr.
8				
9				
10				
11				
12				
1				
2				
3				
4				
5				
6				

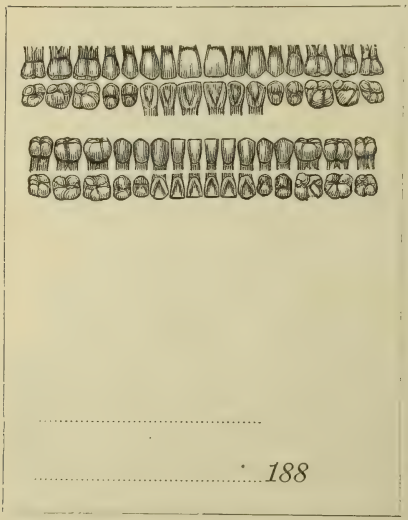
The diagram above shows the size and style of the Record pages, of which there are 360; there are besides 32 pages for memoranda. In the front of the book are calendars for several years, and a table showing the number of days from any given day to the same day in any other month in the year. The diagram being printed in red ink, pencil-marks, however faint, are readily distinguishable. Bound in Morocco, with Tuck; also, in same with Tuck and two Pockets.

Price, with Tuck	$1.00
" " " and two Pockets	1.25

EXAMINATION RECORD.



Dr. Charles F. Allan's "Examinations" scored an immediate success. The first edition was sold in a few months. In this plan of keeping records of examinations, Dr. Allan states that his object is not to give the patient a reminder of the state of his or her teeth at the time they were examined, but to keep the record for his own use. To this end he has the diagram shown above printed on leaves (one side only) 5¾ x 7½ inches. At the bottom of each leaf are blanks for the name of patient and date of examination, the space intervening being used for such memoranda as may be required. The leaves are bound in oblong books containing 100 each, on the front cover of which is the imprint "Examinations. From........ to....................."



....

.... 188

Keeping these accessible, he has only to refer to his ledger to get the date of any examination made; then turn to the "Examinations," and it is but a moment's search to find the one wanted.

The diagram, it will be seen, is one of the most complete in its exposition of the various surfaces of the teeth that has yet been brought forward. The page is too large to be shown full size, but we are able to give it in miniature.

Price, per book of 100 Diagrams, 5¾ x 7½ inches . . 30 cents.

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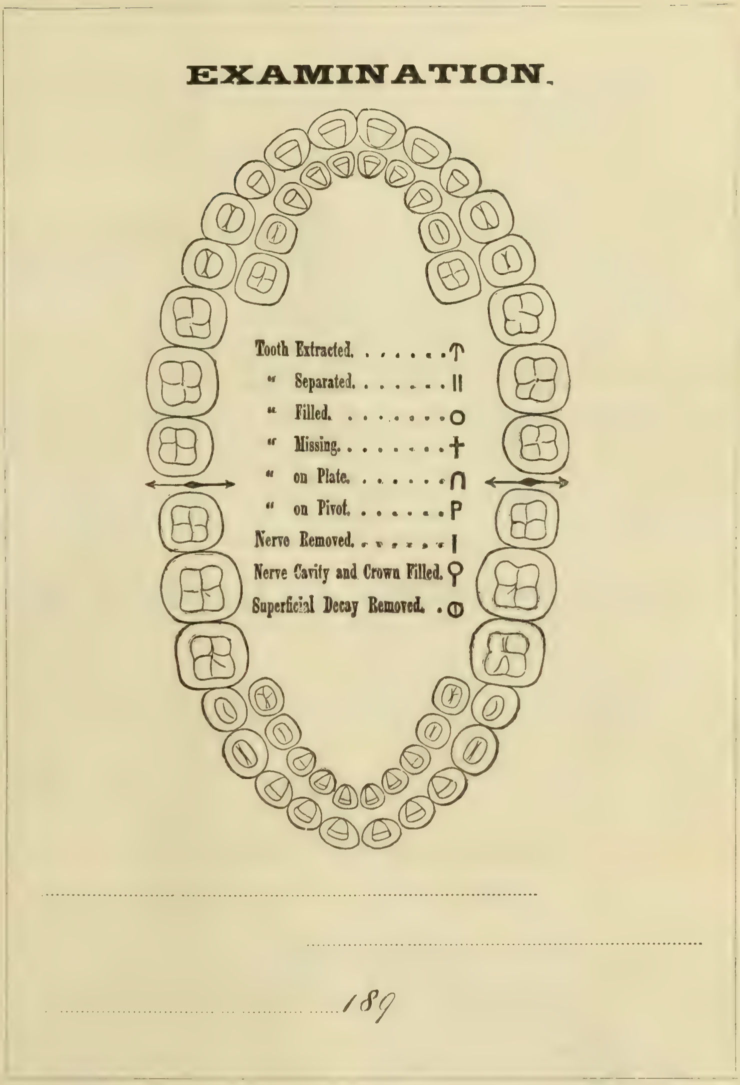

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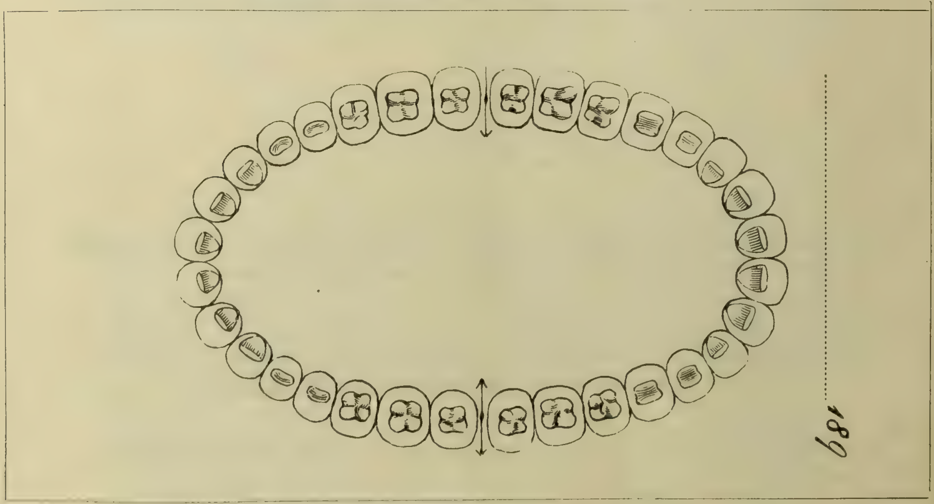

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T. S. WATERS, D.D.S.	Md.	E. R. RUST, D.D.S.	D. C.
DAVID GENESE, D.D.S.	Md.	C. L. ALEXANDER, D.D.S.	N. C.
C. M. GINGRICH, D.D.S.	Md.	G. M. EVANS	N. Y.
J. N. FARRAR, M.D.	N. Y.	K. C. GIBSON	N. Y.

DEMONSTRATORS.

R. BAYLY WINDER, Jr., Phar. G., D.D.S., Demonstrator of Operative Dentistry.
W. G. FOSTER, D.D.S., Demonstrator of Mechanical Dentistry.

ASSISTANT DEMONSTRATORS.

GEORGE E. HARDY, M.D., D.D.S.
W. W. DUMBRACCO, D.D.S.
J. W. SMITH, D.D.S.
C. A. ST. AMAND, D.D.S.
B. D. FRIEDENWALD, D.D.S.
G. MARSHALL SMITH, D.D.S.
J. E. ORRISON, D.D.S.
C. S. SEIBOLD, D.D.S.
W. S. TWILLEY, D.D.S.
A. FOLEY BUTLER, D.D.S.

J. H. BRANHAM, M.D., Demonstrator of Anatomy.
LOUIS F. ANKRIM, M.D., Assistant Demonstrator of Anatomy.

The Baltimore College of Dental Surgery, the first, and for many years the only dental school, offers facilities for the study of dentistry proper such as age and experience only can give. Its immense museum, complete apparatus, large and well-arranged building, and carefully studied curriculum, give to its students great advantages and opportunities, both theoretical and practical, while its age gives its diploma a dignity far out-ranking all other colleges—a diploma honorably represented in all civilized countries, and held by the most distinguished members of the dental profession.

The fact that dentistry must be practically taught is fully recognized, the College Infirmary, a most complete, large, and handsome hall, being daily filled with clean and respectable patients, of a class nearly equal to those of the average dentist. The Infirmary is open all the year, students paying an entrance fee, which is deducted from those of the regular succeeding course.

The session begins October 1, closing in March. A large corps of demonstrators, always present, put in actual practice the teachings of all lecturers in dentistry—leaving nothing undemonstrated. All methods are fully taught, all appliances and apparatus used; the making of instruments and the most elaborate gold and continuous-gum work, and all the cases arising in ordinary practice, with many which are rarely seen, carefully demonstrated.

The College has formed an alliance with the College of Physicians and Surgeons by which its students are privileged to attend all lectures and clinics. The patients of this medical school numbered last year over 40,000.

Graduates of the Baltimore College of Dental Surgery are required to attend but one session at the College of Physicians and Surgeons prior to presenting themselves as candidates for the degree of M.D. (See Catalogue.) In accordance with the resolution adopted by the National Association of Dental Faculties in the City of New York, on the 4th of August, 1884, and which goes into effect for the session of 1885 and 1886, the qualifications for entering the Junior Class are a preliminary examination in the ordinary English branches.

TERMS OF GRADUATION.—Attendance on two winter courses of lectures in this College; as equivalent to one of these we accept one course in any reputable dental college. Graduates in Medicine who have attended one Winter Course in this College, and have passed one year, inclusive of the Winter Course, in the practical work of the infirmary and laboratory, will be permitted to present themselves for graduation.

BENEFICIARY STUDENTS.—Each State Dental Society is privileged to send one Beneficiary Student to this College at one-half the regular fees. This has been for some years an established feature of this College.

FEES.—Matriculation (paid once only), $5.00. Tuition fees, $100.00. Diploma fee, $30.00. Dissecting fee, $10.00.

Students corresponding with the Dean will please be careful to give full address, and direct their letters to

Prof. R. B. WINDER, Dean,
No. 716 Park Avenue, Baltimore, Md.

PHILADELPHIA DENTAL COLLEGE

AND

HOSPITAL OF ORAL SURGERY.

18TH AND CHERRY STREETS.

ANNOUNCEMENT, SESSION 1890-91.

Two years ago the College was removed to its present quarters, Cherry street, above Seventeenth, with a view to enlarged accommodations made necessary by a constantly increasing class. The conveniences acquired by this change, although not surpassed, if equaled, by any Dental College, were soon found inadequate to the demands of the school, to meet which new and commodious Lecture Halls, Surgical Amphitheatre, General Laboratories, Dissecting Rooms, etc., expressly constructed with the view of meeting every requirement. have recently been erected and are now occupied. A three-months' Spring Course opens March 1, and a preliminary Fall Course September 15. These afford unexcelled opportunities, especially to the beginner, for which no fee is charged in addition to that of the Winter Course, which last commences October 1, and closes on the last day of the following February. The Dispensary and Laboratory are open all the year, except during the summer vacation. Practical instruction in dentistry has become a prominent feature of the institution, competent Demonstrators being always present to assist and instruct students in their work. The Dispensary consists of large, well-lighted rooms, furnished with sufficient and comfortable operating chairs, tables, and all conveniences. As an excess of patients is in attendance at the clinics, the opportunities here presented for acquiring a practical knowledge of the profession are ample and complete. The present Dispensary and Dental Laboratory are by far the largest of their kind in the world.

Special Notice.—The Course of this College is so arranged as to enable the student to take his final examinations on Applied Anatomy and Chemistry at the end of the first year, together with an examination on Prosthetic Dentistry, to note if proper progress has been made in that branch, thus leaving for completion at the end of the second year Physiology, Dental Pathology and Therapeutics, Operative and Prosthetic Dentistry, Practice of Dentistry, Anesthetics, and Anesthesia.

Graduation.—Two years' study, including attendance upon two regular Winter Courses of Lectures, and satisfactory examinations in Theory and Practice, are required for graduation. Attendance on one regular Winter Course in any recognized Dental College will be accepted as an equivalent for one Course. Graduates in Medicine are eligible for graduation in Dentistry after one year's attendance on Lectures and Clinical Service.

SPECIAL NOTICE.—By act of the Association of Dental Faculties of the United States, the session of 1890–91 is the last in which students are to be received for a two-year course.

A clinic in *Oral Surgery* is held every Saturday at 12 M.

Fees.—Tickets, including the Demonstrators', $100. Matriculation, inclusive of Syllabi for home study (paid but once), $5; Diploma. $30. Board, $4 to $6 per week.

FACULTY.

HENRY MORTON, A.M. PH.D., Emeritus Professor of Chemistry.
C. A. KINGSBURY, M.D., D.D.S., Emeritus Professor of Dental Histology and Operative Dentistry.

S. H. GUILFORD, D.D.S., PH.D., Professor of Operative and Prosthetic Dentistry.
J. FOSTER FLAGG, D.D.S., Professor of Dental Pathology and Therapeutics.
HENRY I. DORR, M.D., D.D.S., Professor of Practice of Dentistry, Anesthetics, and Anesthesia.
S. B. HOWELL, M.D., D.D.S., Professor of Chemistry and Materia Medica.
THOMAS C. STELLWAGEN, M.D., D.D.S., Professor of Physiology.
JAMES E. GARRETSON, M.D., D.D.S., Professor of Anatomy and Surgery. Surgeon to the Oral Clinic.

J. W. MOFFITT, D.D.S., Demonstrator of Prosthetic Dentistry.
B. C. JEWETT, D.D.S., Demonstrator of Operative Dentistry.

M. H. CRYER, M.D., D.D.S., Chief Assistant of Oral Surgical Clinic.

HENRY C. BOENNING, M.D., Demonstrator of Anatomy.	L. GREENBAUM, M.D., D.D.S., Demonstrator of Chemistry and Materia Medica.

For announcements containing particulars address

Dr. JAMES E. GARRETSON, Dean of the Faculty,
1537 Chestnut Street, Phila., Pa.

UNIVERSITY OF CALIFORNIA, DENTAL DEPARTMENT.

Toland Hall, Stockton Street, between Chestnut and Francisco Streets,

SAN FRANCISCO, CAL.

FACULTY.

HORACE DAVIS, A.B., President of the University and ex-officio President of the Faculty.
JOSEPH LE CONTE, M.D., LL.D., Honorary Professor of Biology.
C. L. GODDARD, A.M., D.D.S., Professor of Orthodontia and Dental Metallurgy.
L. L. DUNBAR, D.D.S., Professor of Operative Dentistry and Dental Histology.
MAURICE J. SULLIVAN, D.D.S., Professor of Dental Pathology and Therapeutics.
W. E. TAYLOR, M. D., Professor of Principles and Practice of Surgery.
A. L. LENGFELD, M.D., Professor of Chemistry and Materia Medica.
WILLIAM B. LEWITT, M.D., Professor of Anatomy.
A. A. DANCONA, A.B., M.D., Professor of Physiology.

LECTURERS.

CHARLES BOXTON, D.D.S., Lecturer on Mechanical Dentistry.
JOHN M. WILLIAMSON, M.D., Lecturer on Descriptive Anatomy.
J. L. ASAY, M.D., Lecturer on Oral Surgery.

DEMONSTRATORS.

H. P. CARLTON, D.D.S., Demonstrator of Operative Dentistry.
EUGENE PAYNE, D.D.S., Assistant Demonstrator of Operative Dentistry.
CHARLES BOXTON, D.D.S., Demonstrator of Mechanical Dentistry.
J. H. BARBAT, Ph.G., M.D., Demonstrator of Anatomy.
S. A. HACKETT, D.D.S., Assistant Demonstrator of Mechanical Dentistry.
M. F. GABBS, D.D.S., Demonstrator of Continuous Gum.
J. T. ROWAND, D.D.S., Demonstrator of Crown- and Bridge-work.
WINSLOW ANDERSON, M.D., Assistant to the Chair of Materia Medica.
EDWARD N. SHORT, D.D.S., Assistant Demonstrator of Operative Dentistry.
EDWARD W. PRATT, D.D.S., Assistant Demonstrator of Mechanical Dentistry and Metallurgy.
CLARK H. RAWSON, Superintendent of Infirmary.

CLINICAL INSTRUCTORS.

GEO. H. CHANCE, D.D.S.
H. C. DAVIS, L.D.S.
WARREN DeCROW.
H. E. KNOX, D.D.S.
F. J. LANE, D.D.S.
W. E. PRICE, D.D.S.
MAX SICHEL.
W. B. KINGSBURY.
A. F. McLAIN, M.D., D.D.S.
E. L. TOWNSEND, D.D.S.
L. VAN ORDEN, M.D.
W. WOOD.

The ninth annual session of the College of Dentistry of the University of California begins on Monday, February 3, 1890, and continues until October 31 (a nine months' course of instruction). There are two general examinations for entrance, viz., the preliminary examination on January 27, and the second on Saturday, March 1. No student will be received for the current term after April 1.

The Infirmary is open throughout the entire year under the charge of a competent superintendent, thus affording a practical course of unsurpassed facilities without extra cost to first and second year students. Beginning with the session of 1892, three years' attendance will be required of all matriculates.

For the course of study, we refer to our annual announcement, which will be furnished anyone upon application.

Surgical and medical clinics are held at the hospital three times a week, to which the dental students are admitted with all the privileges accorded to medical students. The Lecture-Rooms, Operating-Rooms, and Laboratories are commodious, and their appointments complete,—not excelled by any college of the kind in the country.

Requirements for Admission.—Every candidate for admission must be eighteen years of age, and must present to the Faculty satisfactory evidence of a good moral character. Unless already a matriculate of the University of California, or of some other recognized college or university, or a graduate of some recognized academy or high school, or holding a teacher's certificate, he must pass an examination in Arithmetic, Geography, English Grammar and Composition, U. S. History, Natural Philosophy, and Chemistry. Students of private preceptors (in active practice) who have had one year (calendar) or more of practical office training will, upon satisfying the other requirements, be admitted to the Junior class. The preliminary examination for the session of 1890 will be held January 27.

Junior Examination.—At the end of the Junior year students will be examined in Anatomy, Physiology, Chemistry (or Materia Medica), Histology, and Mechanical Dentistry, and those who are qualified will receive certificates of admission to the Senior Class.

Requirements for Graduation.—The candidate for the degree of Doctor of Dental Surgery must have attained the age of twenty-one years. He shall have passed a satisfactory examination, both oral and written,—a written examination being substituted in this college for a thesis. He shall have studied dentistry *three* years, including two courses of lectures, one of which shall be at this institution. Graduates in medicine may apply for the degree of D.D.S., after having had two full years of practical instruction or experience in dentistry, one year of which, including one course of lectures, must be spent in the Dental Department of the University of California. After these requirements have been complied with, upon recommendation of the Faculty and approval by the Board of Regents, the candidate shall receive the degree of Doctor of Dental Surgery.

FEES.

Matriculation (paid but once) . . .	$5.00	Demonstrator of Anatomy's Fees, each year	$10.00
Tuition, first year	120.00	Diploma	30.00
" second year	120.00		
" third year	Free		

L. L. DUNBAR, Dean,

500 Sutter St., San Francisco, Cal.

N.B.—The Medical and Dental Colleges of the University of California, as well as other medical colleges, unlike similar institutions in the Eastern States, hold their sessions during the Spring, Summer, and Fall months.

Harvard University, Dental Department.

BOSTON, MASS., 1890-91.

FACULTY.

CHARLES W. ELIOT, LL.D., President.
THOMAS H. CHANDLER, D.M.D., Dean and Professor of Mechanical Dentistry.
DAVID W. CHEEVER, M.D., Professor of Surgery.
HENRY P. BOWDITCH, M.D., Professor of Physiology.
THOMAS DWIGHT, M.D., Professor of Anatomy.
THOMAS FILLEBROWN, M.D., D.M.D., Professor of Operative Dentistry.
WILLIAM B. HILLS, M.D., Assistant Professor of Chemistry.
CHARLES A. BRACKETT, D.M.D., Professor of Dental Pathology.
EUGENE H. SMITH, D.M.D., Instructor in Orthodontia.
EDWARD C. BRIGGS, M.D., D.M.D., Assistant Professor of Materia Medica and Therapeutics.
JERE E. STANTON, M.D., D.M.D., Instructor in Oral Anatomy and Physiology.

OTHER INSTRUCTORS.

FREDERIC E. BANFIELD, D.M.D., Instructor in Operative Dentistry.
FOREST G. EDDY, D.M.D., Instructor in Operative Dentistry.
ALLSTON G. BOUVÉ, D.M.D., Instructor in Operative Dentistry.
GEORGE H. MONKS, M.D., Instructor in Surgical Pathology.
GEORGE L. WALTON, M.D., Instructor in Neurology.
VIRGIL C. POND, D.M.D., Instructor in Operative Dentistry.
EDWARD E. HOPKINS, D.M.D., Instructor in Crown- and Bridge-Work.
CHARLES P. WORCESTER, M.D., Instructor in Dental Chemistry.
CHARLES H. TAFT, A.B., D.M.D., Instructor in Operative Dentistry.
HENRY M. CLIFFORD, D.M.D., Demonstrator of Operative Dentistry.
PATRICK W. MORIARTY, D.M.D., Demonstrator of Mechanical Dentistry.
WILLIAM F. GAY, D.M.D., Assistant Demonstrator of Operative Dentistry.
EDWIN H. DIXON, D.M.D., Assistant Demonstrator of Operative Dentistry.
CHARLES E. PERKINS, D.M.D., Assistant Demonstrator of Operative Dentistry.
CECIL P. WILSON, D.M.D., Clinical Lecturer in Operative Dentistry.
WM. P. COOKE, D.M.D., Clinical Lecturer in Operative Dentistry.
DWIGHT M. CLAPP, D.M.D., Clinical Lecturer in Operative Dentistry.
WILLIAM H. POTTER, A.B., D.M.D., Clinical Lecturer in Operative Dentistry.

The Twenty-third Annual Session of this school begins Sept. 25, 1890, and ends June 24, 1891, with a recess of one week at Christmas, and another in April, making a school-year of nine months of practically continuous work.

General Anatomy, by Dr. Thomas Dwight; *Physiology*, by Dr. H. P. Bowditch; *Materia Medica* and *General Chemistry*, by Dr. Wm. B. Hills, together with ample dissecting under able demonstrators, are the studies of the first year, the dental students taking the whole first-year course of the Harvard Medical School. The studies for the second year are Operative and Mechanical Dentistry, Dental Materia Medica and Therapeutics, Oral Surgery, and Surgical Pathology. Attention is called to the fact that *eighteen months* of progressive instruction compose the required two years in the school.

All applicants for advanced standing must pass the first year's examinations, or furnish proof that they have passed *equivalent* examinations in some recognized Dental or Medical School.

At the end of each year written and oral examinations test the student's knowledge, and he must pass satisfactorily in a majority of the first-year studies before he can pass on to the second year's class.

To those wishing to take the medical degree the first year of this school is allowed in the Medical School of the University, after passing the required entrance examinations.

The University Degree, D.M.D. (*Dentariæ Medicinæ Doctor*), is conferred upon all who fulfill the requirements.

The diploma is accepted by the English Board of Registration under the new Dental Act, so that graduates of this school, *not British subjects*, can practice dentistry in Great Britain without further examination.

Graduates of recognized dental schools will be admitted to the courses of Operative and Mechanical Dentistry on payment of $50 each, or $100 for both, for the whole or any portion of the academic year.

FEES.

There are no fees for matriculation, nor for the diploma, nor for the demonstrators. For the first year a student is a member of the school the fee is $200, payable in two installments of $120 and $80; for the second year, $150, in two payments of $100 and $50; for any subsequent year, $50. For information and announcements address

THOMAS H. CHANDLER, Dean,
161 Newbury Street, Boston, Mass.

UNIVERSITY OF PENNSYLVANIA.

DEPARTMENT OF DENTISTRY.

FACULTY.

WILLIAM PEPPER, M.D., LL.D., Provost, and *ex-officio* President.

CHARLES J. ESSIG, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy.
EDWIN T. DARBY, M.D., D.D.S., Professor of Operative Dentistry and Dental Histology.
JAMES TRUMAN, D.D.S., Professor of Dental Pathology, Therapeutics, and Materia Medica.
JOSEPH LEIDY, M.D., LL.D., Professor of Anatomy.
THEODORE G. WORMLEY, M.D., LL.D., Professor of Chemistry.
EDWARD T. REICHERT, M.D., Professor of Physiology.
GEORGE A. PIERSOL, M.D., Professor of Normal Histology.
JOHN MARSHALL. M.D., NAT. SC. D., Assistant Professor of Chemistry.

ROBERT HUEY, D.D.S., Lecturer on Operative Dentistry.
EDWARD C. KIRK, D.D.S., Lecturer on Operative Dentistry.
JOHN D. THOMAS, D.D.S., Lecturer on Nitrous Oxide.

CLINICAL INSTRUCTORS.

DR. C. S. BECK.
DR. H. C. LONGNECKER.
DR. W. G. A. BONWILL.
DR. W. R. MILLARD.
DR. E. H. NEALL.
DR. H. C. REGISTER.
DR. GEO. W. KLUMP.
DR. R. R. UNDERWOOD.
DR. I. F. WARDWELL.
DR. J. A. WOODWARD.

DEMONSTRATORS.

WILLIAM DIEHL, D.D.S., Demonstrator of Operative Dentistry.
JOSEPH W. WHITE, D.D.S., Assistant Demonstrator of Operative Dentistry.
JAMES E. LODER, D.D.S., Assistant Demonstrator of Operative Dentistry.
J. E. DUNWOODY, D.D.S., Assistant Demonstrator of Operative Dentistry.
CHAS. A. E. CODMAN, D.D.S., Assistant Demonstrator of Operative Dentistry.
LUTHER M. WEAVER, D.D.S., Assistant Demonstrator of Operative Dentistry.
HARRY B. MCFADDEN, D.D.S., Demonstrator of Mechanical Dentistry.
AMBLER TEES, JR., D.D.S., Assistant Demonstrator of Mechanical Dentistry, and Demonstrator of Continuous-Gum work.
FREDERICK W. AMEND, JR., D.D.S., Assistant Demonstrator of Mechanical Dentistry.
R. HAMILL D. SWING, D.D.S., Assistant Demonstrator of Mechanical Dentistry.
MILTON N. KEIM, JR., D.D.S., Assistant Demonstrator of Mechanical Dentistry.
HORACE MCCANNA, D.D.S., Assistant Demonstrator of Mechanical Dentistry.
JOHN G. FULLER, D.D.S., Assistant Demonstrator of Mechanical Dentistry.
FREDERIC A. PEESO, D.D.S., Demonstrator of Crown- and Bridge-work.
JOHN B. DEAVER, M.D., Demonstrator of Anatomy.

The appointments of the Lecture-Rooms, Operating-Room, and Laboratories are the most complete in America.

The belief entertained when the Dental Department was started that the facilities for obtaining a supply of clinical patients were ample, has been fully realized, and owing to the unequaled accommodations and appointments of the new operating-room, the daily applications are now largely in excess.

Laboratory instruction of each student, not only in Practical Dentistry but also in Practical Chemistry, forms a prominent feature in the Department of Dentistry.

FEES.

Matriculation Fee	$5.00	Dissecting Fee	$10.00
Fee for One Course of Lectures . .	100.00	Graduation Fee	30.00

Board can be obtained at from five to eight dollars per week, according to location and accommodations. In locations near the college, students generally pay about five dollars per week.

Students of the Dental Department have access without additional charge to all the other lectures and clinics in the Medical Department.

Surgical Clinics at University Hospital twice a week; at Philadelphia Hospital, contiguous to the grounds of the University, Wednesday and Saturday.

University of Pennsylvania.—Dental Department.

The dental department possesses the means for thorough training, both theoretical and practical, not surpassed, it is believed, by any other institution. The operating-room is 151 feet in length by 46 feet in width, and lighted by windows on all sides. In front of each window is placed a Morrison Chair, a handsome nickel-plated movable bracket, and a neat walnut table. Battery wires are arranged to a number of the chairs for the use of electric pluggers.

The Mechanical Laboratory is supplied with all the modern appliances, and is under the care of an able and experienced mechanician. Special clinics will be given in continuous-gum work by the professor of mechanical dentistry and metallurgy.

The extensive Chemical Laboratories are under the charge of a demonstrator well qualified to meet all the requirements of his position.

The Dissecting-Room is large, well lighted, thoroughly ventilated, and is furnished with ample material for the successful prosecution of anatomical studies.

THE REGULAR OR WINTER SESSION.

The session will commence October 1, and continue until the 1st of May. The number of lectures per week, with a synopsis of the various branches taught, will be found in the General Catalogue.

In order to facilitate work in the practical departments, and to fully employ the student's time, the regular winter sessions are so arranged that the first-course student is required to devote the morning hours equally between *dental and chemical laboratory work.*

During the second year the student has the entire forenoon of each day for practical dental work. Ample opportunity is afforded for practice in operative and mechanical dentistry. In the latter branch, the students of the Junior year are divided into sections, thus devoting the time not otherwise engaged to practice in the operative and mechanical rooms

It is believed that this plan of *grading the course*, and of affording the first-year student an opportunity of coming forward for examination in the branches of chemistry and materia medica, will not only prove an economical arrangement of his time, but will really facilitate his labors in the acquirement of knowledge in the remaining branches.

PLAN OF EXAMINATIONS.

Attendance upon two regular winter courses of lectures will be required before the final examination for the degree of Doctor of Dental Surgery.

At the close of the first year, examinations are held in *chemistry and materia medica.* If the student is not qualified, a second examination is afforded him at the beginning of the next winter session.

The final examination is in *anatomy*, *physiology*, *operative dentistry*, *mechanical dentistry*, *metallurgy*, *dental pathology and therapeutics*, *and normal histology.*

Students who have attended one full term in another dental school recognized by the Faculty will be admitted to the graduating class upon presentation of the required certificate.

Students holding a medical diploma will be admitted to the Senior class, but will be required to spend a year in the study of practical Dentistry in the Operative and Mechanical Departments, the year to include the regular winter's course of lectures.

Students who have attended but one course in a medical college will be required to take two winter courses in this Department.

A preliminary examination will be required for entrance to the first or Junior year. The requirements will be a good English education.

Students who have certificates properly attested from colleges or other schools of reputable character will be accepted without examination.

SPECIAL NOTICE.

The Board of Trustees of the University of Pennsylvania having adopted the rule of the National Association of Dental Faculties requiring a three years' course in all Dental Colleges and Departments under its jurisdiction, notice is hereby given that the coming session (1890-91) is the last at which students can be received for the two-year course; and that matriculates entering this Department at the session of 1891–92 or thereafter will be required to remain three winter sessions before they are entitled to an examination for the degree of Doctor of Dental Surgery.

JAMES TRUMAN, D.D.S.,
Dean of the Dental Faculty, 3243 Chestnut Street,
PHILADELPHIA.

UNIVERSITY OF MARYLAND.

DENTAL DEPARTMENT.

N. E. COR. LOMBARD AND GREENE STREETS, BALTIMORE, MD.

Hon. SEVERN TEACKLE WALLIS, LL.D., Provost.

FACULTY.

Ferdinand J. S. Gorgas, M.D., D.D.S., Professor of Principles of Dental Science, Surgery, and Mechanism.

James H. Harris, M.D., D.D.S., Professor of Operative and Clinical Dentistry.

Francis T. Miles, M.D., Professor of Physiology.

L. McLane Tiffany, M.D., Clinical Professor of Oral Surgery.

J. Edwin Michael, M.D., Professor of Anatomy.

R. Dorsey Coale, Ph.D., Professor of Chemistry and Metallurgy.

I. Edmondson Atkinson, M.D., Professor of Materia Medica and Therapeutics.

John C. Uhler, M.D., D.D.S., Demonstrator of Mechanical Dentistry.

Isaac H. Davis, M.D., D.D.S., Demonstrator of Operative Dentistry.

Herbert Harlan, M.D., Demonstrator of Anatomy.

The Principal Demonstrators are assisted by *sixteen* Assistant Demonstrators. Special Instructions are given in Continuous-Gum and Bridge-Work.

CLINICAL INSTRUCTORS.

Dr. Edward Maynard, D. C.
Dr. W. G. A. Bonwill, Penna.
Dr. A. J. Volck, Md.
Dr. Sam'l J. Cockerille, D. C.
Dr. E. S. Chisholm, Ala.
Dr. Geo. H. Winkler, Ga.
Dr. T. T. Moore, S. C.
Dr. John Murray, Penna.
Dr. W. S. McDowell, Md.
Dr. William Farmer, Va.
Dr. Judson B. Wood, Va.
Dr. George H. Chewning, Va.
Dr. G. S. F. Wright, S. C.
Dr. Walter S. Harban, D. C.
Dr. Frank L. R. Wood, Me.
Dr. Ellis B. Bliss, D. C.
Dr. Arthur M. Rice, Conn.
Dr. L. M. Cowardin, Va.
Dr. David Genese, Md.
Dr. Charles L. Steel, Va.
Dr. J. Allan Osmun, N. J.
Dr. Sam'l A. White, Ga.
Dr. W. W. Allport, Ill.
Dr. J. B. Patrick, S. C.
Dr. W. W. Evans, D. C.
Dr. L. G. Noel, Tenn.
Dr. V. E. Turner, N. C.
Dr. Geo. W. Field, Eng.
Dr. W. C. Wardlaw, Ga.
Dr. A. F. Claywell, Tenn.
Dr. Geo. B. Steel, Va.
Dr. Henry C. Jones, Va.
Dr. W. S. Carruthers, Texas.
Dr. Dan'l McFarlan, D. C.
Dr. A. G. Bouton, Ga.
Dr. Thos. H. Davy, Md.
Dr. B. H. Teague, S. C.
Dr. Wm. B. Wise, Va.
Dr. S. Dwight Hodge, Vt.
Dr. C. P. Baird, Tenn.
Dr. Edwin S. Niles, Mass.

At stated times during the Annual Sessions a number of the Corps of Clinical Instructors will hold Clinics and deliver Clinical Lectures.

Each year since its organization has added to the reputation and prosperity of this University Dental School, until now its graduates, in almost every part of the civilized world, are meeting with the success that ability will ever command. The past session was the most successful one in number of matriculates ever held; and visiting dentists from all parts of this country have expressed themselves as being astonished and gratified at the ability shown by the students when operating upon patients in the Infirmary. Forming one of the departments of *one of the oldest Universities* in this country, its diploma is everywhere recognized and honored.

The instruction in both operative and mechanical dentistry is as thorough as it is possible to make it, and embraces everything pertaining to dental art. The advantages which the general and oral surgical clinics, to which the dental students are admitted, as indeed to all the lectures of the University, afford, cannot be overestimated. The many thousands of patients annually treated in the University Hospital, well known to be the largest Hospital in Baltimore, afford an abundance of material for dental infirmary and laboratory practice, and the oral surgery clinics.

The Dental Infirmary and Laboratory Building is one of the largest and most complete structures of the kind in the world. The Infirmary is lighted by forty-seven large windows, and is furnished with the most improved operating chairs. It has again become necessary to enlarge the Dental Building, making an Infirmary nearly one hundred feet long, and a Laboratory eighty feet long and forty-three feet wide.

The Dental Infirmary and Laboratory are open daily (except Sundays) during the entire year for the reception of patients; and *the practice for dental students* has increased to such an extent that all the students during the past session have had an abundance of practical work in both operative and prosthetic dentistry. This means for practical instruction has already assumed such large proportions that the supply has been beyond the needs of the large classes in attendance during the past sessions. The exceedingly large number of patients for the extraction of teeth affords ample facilities for practical experience to every student.

In addition to the facilities afforded by this institution for a thorough course of instruction in the theory and practice of dentistry, the clinics in the University Hospital enable the Dental equally with the Medical Students to become familiar with the diseases and operations of Practical Surgery. Excisions of jaw, partial or entire; tumors, cancerous or benign, of various parts of the buccal cavity; plastic operations for restoration of cheek, lips, etc., may be mentioned as having been before the class during the year. The induction of anesthesia by means of different agents—ether, chloroform, bromide of ethyl, nitrous oxide gas, all being used in the clinics—cannot fail to be of use to the student of Oral Surgery. Junior as well as Senior students are afforded every opportunity for practical instruction in both operative and mechanical dentistry.

The Lecture Halls in the University Buildings are large and well lighted; and every facility will be afforded for practical and theoretical dental instruction. Demonstrations in Anatomy, Physiology, and Pathology (for which an abundance of material is furnished **free of charge**), also form an important part of the regular course. The Dissecting Room is large, well ventilated and lighted, and the Demonstrator of Practical Anatomy passes much of his time in assisting the students and directing their labors. **Dissecting Material is furnished in abundance, free of charge.**

The Qualifications for Admission and Graduation are those adopted by the National Association of Dental Faculties and the State Dental Examining Boards. The Diplomas of this School are recognized by all State Dental Examining Boards.

Qualifications for Graduation: The candidate must have attended two full courses of lectures of five months each in different years at the **Regular** or Winter Sessions in this institution. The following, however, will be considered as an equivalent to an attendance on one course of lectures in this College:—One course in any reputable Dental College; graduation in a reputable Medical College with one year of dental pupilage in a dental infirmary. The student meeting either of the above requirements will have the privilege of presenting himself as a candidate for graduation at the end of but one Course of Lectures. The matriculant must have a good English education; a diploma from a reputable literary institution, or other evidence of literary qualification will be received instead of a preliminary examination. All students, both juniors and seniors, have equal advantages in operative and mechanical dentistry in this institution throughout every session.

Graduation in Medicine: Graduates of the Dental Department of the University of Maryland are required to attend but **one session** at the University School of Medicine prior to presenting themselves as candidates for the degree of "Doctor of Medicine." (See Catalogue.)

The **Regular** or **Winter Session** will begin on the 1st day of October, and will terminate in March of each year.

The **Summer Session**, for practical instruction, will commence in March, and continue until the regular Session begins. Students in attendance on the Summer Session will have the advantages of all the daily Surgical and Medical Clinics of the University.

The fees for the Regular Session are $100, Demonstrators' Fees included; Matriculation Fee, $5; Diploma Fee, for candidates for graduation, $30; Dissecting Ticket, $10.

For Summer Session, no charge to those who attend the following Winter Session.

Beneficiary.—A Beneficiary student will be received from each State, on the recommendation of the State Dental Society, on the payment of half of the tuition fees. Board can be obtained at from $3.50 to $5 per week, according to quality.

The University Prize and a number of other Prizes will be specified in the annual Catalogue.

Students desiring information and the annual Catalogue will be careful to give full address and direct their letters to

F. J. S. GORGAS, M.D., D.D.S.,
Dean of the Dental Department of the University of Maryland,
845 N. Eutaw Street, Baltimore, Md.

COLLEGE OF DENTISTRY.

Department of Medicine. University of Minnesota.

FACULTY.

W. XAVIER SUDDUTH, M.D., D.D.S., Professor of Pathology and Oral Surgery.
THOMAS E. WEEKS, D.D.S., Professor of Operative Dentistry.
C. M. BAILEY, D.M.D., Professor of Prosthetic Dentistry.
EDWARD H. ANGLE, D.D.S., Professor of Histology and Orthodontia.
R. O. BEARD, M.D., Professor of Physiology.
G. A. HENDRICKS, M.D., Professor of Anatomy.
C. J. BELL, A.M., Professor of Chemistry.
HENRY M. BRACKEN, M.D., } Professors of Materia Medica and Therapeutics.
WILLIAM E. LEONARD, M.D., }

This College has a three-years course which is strictly graded, both in its didactic and its technical work.

The **Session** for 1890-91 begins October 6, and continues eight months.

Fees. For residents of Minnesota, $35.00; for non-residents, $60.00. For further information, or for catalogue, address

W. XAVIER SUDDUTH, M.D., D.D.S., Secretary,
Cor. Sixth St. and Ninth Ave. S., Minneapolis, Minn.

AMERICAN COLLEGE
OF
DENTAL SURGERY,

78 to 80 State Street, Chicago, Ill.

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Spring Term Opens April 4, 1890.
Winter Term of 1890-91 Opens Sept. 26.

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M. A. NEWMAN, D.D.S., Prof. Clinical Dentistry, 78 State St.

FEES.

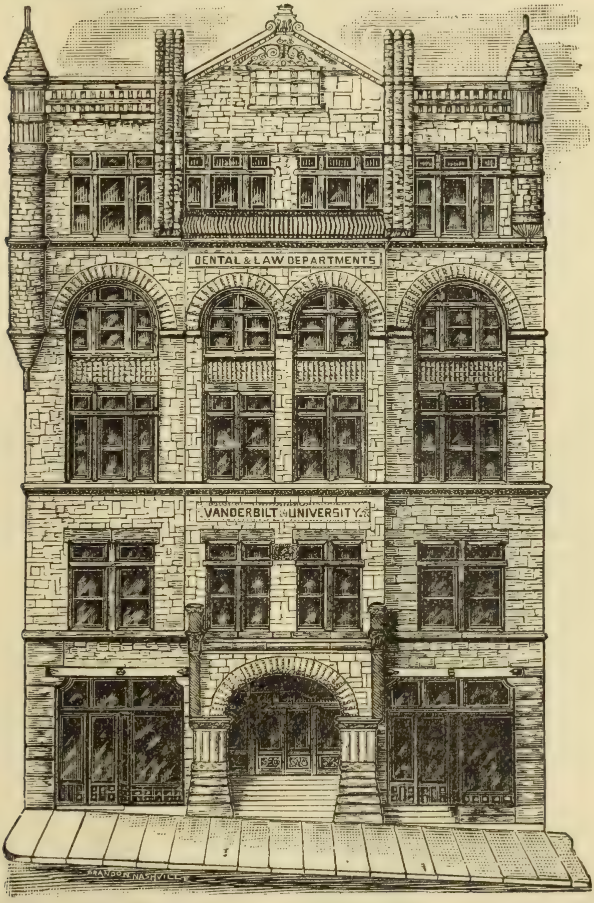
Spring Term	$25.00
Winter Term	75.00

For desired information, address

I. CLENDENEN, M.D., Secretary,
78 State Street, Chicago, Ill.

VANDERBILT UNIVERSITY.

DEPARTMENT OF DENTISTRY.



JAMES C. ROSS, D.D.S., Emeritus Professor of Operative Dentistry and Dental Hygiene.
WM. H. MORGAN, M.D., D.D.S., Professor of Clinical Dentistry, Oral Surgery, and Pathology.
ROBERT R. FREEMAN, M.D., D.D.S., Professor of Mechanical and Corrective Dentistry.
THOS. A. ATCHISON, M.D., Professor of Materia Medica and Special Therapeutics.
D. R. STUBBLEFIELD, A.M., M.D., D.D.S., Professor of Chemistry and Metallurgy.
AMBROSE MORRISON, M.D., Professor of Anatomy and Physiology.
ORVILLE H. MENEES, M.D., Professor of Oral Surgery, Histology, and Pathology.
HENRY W. MORGAN, M.D., D.D.S., Professor of Operative Dentistry and Dental Hygiene.

JOHN H. KELLEY, Lecturer on Analytical Chemistry.

DEMONSTRATORS.

A. P. JOHNSTONE, D.D.S., Demonstrator of Operative and Mechanical Dentistry.
SIDNEY S. CROCKETT, M.D., Demonstrator of Anatomy.

The FALL COURSE begins the first Monday in September; the WINTER COURSE the first day of October.

FEES.

Matriculation (each year) . .	$5.00	Professor Tickets for each year .	$75.00
Diploma	25.00	Dissecting fee	10.00

The eminent success of the Dental Department of Vanderbilt University has prompted the Board of Trust to erect a large five-story building at a cost of ninety-six thousand dollars for its accommodation and for the Law Department. It will surpass any Dental College building in the United States.

All communications and letters asking further information, and for special catalogues should be addressed

Dr. W. H. MORGAN, Dean,
211 N. High Street, Nashville, Tenn.

INDIANA DENTAL COLLEGE,

INDIANAPOLIS.

1890—1891.

The Twelfth Regular Term will begin on Wednesday,
October 1, 1890, and continue until in
March, 1891.

FACULTY.

P. G. C. Hunt, M.D., D.D.S., Professor of Crown, Bridge, and Porcelain Work.
T. S. Hacker, D.D.S., Professor of Mechanical Dentistry.
J. R. Clayton, M.D., D.D.S., Professor of Operative Dentistry, Development and Pathology of the Teeth.
M. F. Ault, M.D., D.D.S., Professor of Physiology and Histology.
A. C. Kimberlain, M.D., Professor of Anatomy.
J. H. Oliver, M.D., Professor of Oral Surgery and Pathology.
Alembert W. Brayton, B.S., M.D., Professor of Biology, Bacteriology, and Microscopy.
J. N. Hurty, M.D., Ph.D., Professor of Chemistry and Metallurgy.
Edward D. Moffett, M.D., Professor of Materia Medica.

An ample number of Demonstrators is always provided, and each student receives the benefits of the personal attention of the Faculty.

Our clinics are so full and complete that every student may be certain of being brought into contact with all forms and kinds of dental work.

Unusual preparations have been made to present Crown, Bridge, and Porcelain Work. Continuous-Gum, Porcelain Inlays, and Carving and Burning of Block Teeth will be fully demonstrated and explained.

The Infirmary and Mechanical Laboratory are provided with the latest electrical appliances for dental uses.

Entire College Fees, First Term, $100.00.

Second Term Fees are the same, except that Senior students are required to deposit the diploma fee, $25.00, by February 1, which will be returned to those who may fail to pass the required examination.

There are no extras incident to a Term in this College. The Annual Announcement is now ready.

For further information, address

J. N. HURTY, Secretary,
Indianapolis, Ind.

CHICAGO COLLEGE

—OF—

DENTAL SURGERY

122 Wabash Avenue,

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Winter Course

WILL BEGIN

Wednesday, Sept. 24, 1890.

FOR INFORMATION, ADDRESS

DR. TRUMAN W. BROPHY, DEAN,

96 State Street.

ESTABLISHED 1845.

Ohio College of Dental Surgery.

DEPARTMENT OF DENTISTRY—UNIVERSITY OF CINCINNATI.

SESSION 1890-91.

FACULTY.

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H. A. SMITH, D.D.S., Dean of The Faculty, Professor of Operative Dentistry and Dental Pathology.
C. M. WRIGHT, D.D.S., Professor of Physiology and General Pathology.
WM. KNIGHT, M.D., D.D.S., Professor of Anatomy and Oral Surgery.
GRANT MOLLYNEAUX, D.D.S., Professor of Mechanical Dentistry and Metallurgy.

C. I. KEELY, D.D.S.,
Lecturer on Irregularities of the Teeth.

L. E. CUSTER, D.D.S.,
Lecturer on Anæsthetics and Obtundents.

DEMONSTRATORS.

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Demonstrators of Operative Dentistry.

H. T. SMITH, D.D.S.,
Demonstrator of Analytical Chemistry.

H. C. MATLACK, D.D.S.,
Demonstrator of Anatomy.

MAX J. H. MARTIN,
Demonstrator of Mechanical Dentistry.

The Fifty-fifth annual session begins Wednesday, October 1, 1890.

FEES.

Junior Year.		Senior Year.	
Matriculation	$5.00	Professors' Tickets	$75.00
Professors' Tickets	75.00	Analytical Chemistry Ticket	10.00
Dissecting Tickets	10.00	Diploma Fee	25.00

For further information and Announcements, address
H. A. SMITH, Dean.
or **H. T. SMITH, D.D.S., Secretary,**
128 Garfield Place, CINCINNATI, O.